AN INTRODUCTION TO THE PHILOSOPHY OF NATURE

Compiled by
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PREFACE

This text is designed to introduce the student pursuing the liberal arts to the study of the philosophy of nature. With a view toward making the book flexible enough to meet the needs of different teachers of the subject I have made it a compilation of certain fundamental texts. For those who wish to give a rapid survey of the principles of the subject and of the science, as we try to do here at the College of St. Thomas, there are the three introductory chapters and St. Thomas' *Principles of Nature*. In such a survey the other texts will be used only as reference materials. However, for those who have more time and wish to use this for a more advanced study, there are the texts of the Commentary on the first two books of the *Physics* of Aristotle. In either employment of this text, I have presupposed that the teacher will supplement the material given here.

My indebtedness for the material in the book is obvious. However, I must say also that even the choice of the texts to be presented is not mine alone but was made with the help of the members of the Philosophy Department here at the College of St. Thomas. Practically the only parts which I can claim are the few introductory notes and the translations of the texts, along with any errors pertaining thereto. I want to take this occasion to thank Father E. P. Emmans, O.P. for his persevering efforts to show me the difficulties of translation. Finally, I wish to thank Miss Natalie Lincoln whose truly Christian charity has been an *assisting* efficient cause in my philosophical development.

R. A. K.

INTRODUCTION

The rapid development of experimental science in this century, culminating as it did in the development of atomic fission, has compelled the educated man to take a deeper interest in the works of Nature. This curiosity is not shown only in the larger registration for courses in physics, chemistry and biology. This trend was growing even before these later discoveries. The really profound interest in the works of Nature is being expressed by the students in every field who have a truly liberal education. These men are asking such questions as the following: Should the scientist use his discoveries for war? Has the scientist any obligation or right to direct his research towards good or evil? What right or obligation has the State with regard to purely scientific research and discovery?

These questions, while being timely and of urgent importance, are exceedingly difficult. Most thinkers would recognize in them what might be called 'a philosophical dimension'. As such they depend in their resolution on the solution of other problems which are at least equally difficult. We must know, for example, what relation exists between experimental science and philosophy. This will bring up further problems: What is philosophy? What are the answers given by the philosopher and how are they to be evaluated? What is the difference between 'Philosophy', 'Philosophy of Nature' and 'Metaphysics'? What is meant by 'practical philosophy'?

The student with a liberal education rightly feels that such questions should be intelligent to him and that, further, he should be equipped, at least rudimentarily, with the tools necessary for resolving such doubts. Obviously it is not required that any one course resolve all or even any large portion of such questions and difficulties. This *Introduction to the Philosophy of Nature* is offered as the first step into a field of knowledge which, for most students, is a dialectician's nightmare 'full of sound and fury'. As an introductory course, it will primarily consider the subject of the Philosophy of Nature with a brief reference to the causes by which conclusions about that subject are demonstrated. The text for this part of the course will be the work of St. Thomas Aquinas *On the Principles of Nature* with references to his commentary on the first two books of Aristotle's *Physics*.

However, before proceeding with that part of the course, certain notions will be set forth suppositionally in order that the student might orientate himself and thus get a better perspective in the work to follow.

CHAPTER I

EXPERIMENTAL SCIENCE AND THE PHILOSOPHY OF NATURE

Even a casual glance at the universe around us will raise a multitude of questions requiring an explanation. However, before we ask for any explanations, it might be well to find out what 'an explanation' is. In order to find out how the modern scientists 'explain' things, let us examine briefly one of the more recent problems in the science of astronomy. From certain 'facts' at their disposal the modern scientists 'know' that the nebulae in the universe are speeding away from each other—our universe is expanding. The scientist now wants to know why this is so. An 'explanation' has been given by the French scientist l'abbé Georges Lemaitre. He said that at the beginning of the universe all matter was gathered together in a very small space—a sort of 'primitive atom'. For some reason (the 'explanation' does not precisely resolve this question) this primitive atom exploded. As a result of this explosion there is now a force in the universe called 'cosmic repulsion' which is driving the parts of the original atom farther and farther apart. The presently existing stars, planets and nebulae are 'explained' by another force, opposed to the first, which is called 'gravitation'. Now, if we suppose that there is such a force as cosmic repulsion, we can explain the expansion of the universe. The argument is as follows:

That which has cosmic repulsion is expanding.
But the universe possesses cosmic repulsion.
Therefore the universe is expanding.

In mathematics also we have a similar form of explanation. If we wish to explain the fact that the interior angles of a triangle are equal to two right angles, we can do so by saying that any exterior angle of a triangle is equal to the two opposite interior angles with the following argument:

A figure which has one of its exterior angles equal to the two opposite interior angles has its interior angles equal to two right angles.
The triangle is such a figure.
Therefore the triangle has its interior angles etc.

This basic form of explanation will be found to be the one which was studied in logic under the form of the syllogism. In general it is exemplified by the first mode of the first figure:

M is P
S is M
Therefore S is P

Notice, however, that in both the example of an explanation taken from experimental science and that taken from mathematics there is a possibility, or even the necessity, of a further explanation. We can demand a reason for the cosmic repulsion and a reason for the equality of the exterior angle to its two opposite interior angles. How far back can we push these 'reasons'? According to Aristotle, St. Thomas and many other philosophers, we shall finally come to sense perception as the ultimate reason or foundation for our conclusions. *All human knowledge begins with sense perception.*

However, although all our intellectual knowledge depends upon sense perception, this dependence can be either essential or accidental. If we take two such propositions as the following:

1. A whole is composed of parts.
2. All snow is white.

we shall see that, while both depend upon sense perception, they do not have the same sort of dependence. While it is true that the first proposition cannot be formed if we have not had a prior sense percept, we have a notion that, having formed the proposition, we will hold to its truth regardless of future sense knowledge. This is another way of saying that our intellect grasps something in this first proposition which it is able to understand independently of the sense perception which originated it. Once we have understood the terms 'whole' and 'part' we can know that the terms are correlative in such a way that one necessarily implies the other. On the other hand, we can never be certain of the second proposition in this way. Our intellect does not see in the terms 'snow' and 'white' any necessary connection. Although our senses tell us that these two terms are connected, our intellect can see no necessary connection between these as it did between 'whole' and 'part'. It is not unthinkable that at some time in the future snow would be some other color and still be snow. Thus we say that the terms 'snow' and 'white' are combined in our judgment only because of the sense perception, while the

terms 'whole' and 'part' would be combined in our judgment even without sense perception, if that were possible.

Starting from the two kinds of propositions drawn from sense-knowledge our intellect goes on to formulate further truths by the use of the syllogism. These syllogisms, from the point of view of their form, will be equally valid or 'rigorous'. However, from the point of view of their matter, they will be radically different. When I see in the terms themselves that a proposition is true and then deduce a further proposition from this, I am certain that the conclusion is true, if the syllogistic form is valid. On the other hand, when I begin my reasoning from a proposition which is enunciated only because I see the connection of the terms in sense perception, in other words when the proposition is not self-evident, or deduced from self-evident propositions, my conclusion will retain this uncertainty.

Aristotle and St. Thomas have distinguished these two kinds of knowledge and have called the first *science* and the second *dialectic*. In the strictly scientific syllogism the middle term is a definition, while in the dialectical definition it is an hypothesis. Returning to the examples of explanations given earlier, we might show them in schematic form as follows:

D is P	H is P
S is D	S is H
therefore S is P	therefore S is P

where P is a property, D a definition and H a hypothesis.

Aristotle usually uses *science* only in this very restricted sense. Considering only the causal definition, he defines science as certain knowledge through causes. He restricts the term *demonstration* to this type of knowledge, as when he says that demonstration is a syllogism which proves that a property belongs to a subject by means of a definition.

From all this it should be evident that men have very little *science* in the very strict meaning of that term. Still, however small that knowledge may be, it is better, as knowledge, than the mass of data which man derives from all his other natural modes of knowing. It is this type of knowledge which we are seeking in the Philosophy of Nature.

CHAPTER II

THE PROBLEM OF MOTION

One of the most obvious percepts of the world around us is the fact that things move. The fact is so obvious that we usually fail to see the problem involved. However, even a very superficial examination of this phenomena will reveal many difficulties. We say that things move. By motion we mean not only a change of place but also a change of quality and even a change of substance: The oak tree is a different substance from the acorn. This means that mobile things are successively *other;* they do not remain the same. But this seems to be a contradiction: The mobile being, in order to be, must be successively other. If it is always other, how can it be what it is? Moreover, if it is not always the same throughout the succession, how can we say that the succession is continuous? It seems that the mobile being is a being which changes and which does not change.

Can we say that a mobile being is one which is composed of two parts, one of which changes while the other is immobile? This solution is too easy. The same problem would arise as to the changing *part*: how could we say that the successive change in this part is continuous? Still some distinction must be made. How are we going to make this distinction?

The metaphysician demonstrates that the essence and the existence of any finite being are really distinct. Can we use this distinction to resolve our difficulty? Can we say that the existence is constantly changing while the essence remains immobile and by this immobility the identity of the being is safeguarded? No, this solution will not resolve the difficulty. Such an essence would have an existence which was at the same time simultaneous and successive. By this we see that the mobility of which we are speaking penetrates the very essence of the mobile being. But how can mobility penetrate my essence if my essence is that which makes me what I am. If, while enduring, I change essentially, I am always essentially other: my identity vanishes. I can no longer say that yesterday I taught a class because I am no longer myself.

The problem is becoming more and more difficult. My essence

must necessarily be capable of receiving existence successively without losing its identity. This forces us to say that this essence must be *multiple*. This is not to be understood as a multiplicity of things because then the same problem arises all over again (it would be like saying that a mobile being is possible only if it is non-mobile), rather the multiplicity should be of elements of another order. The multiple in question must show us how a being which endures successively and continuously is possible. The elements, therefore, by their very definition will be the conditions of the being of the mobile. They will be principles of the essence of the mobile being. One of these will permit this essence to receive existence successively while the other will safeguard the identity of that essence.

Keeping this problem in mind, we turn now to St. Thomas' *Principles of Nature*.

THE PRINCIPLES OF NATURE

By ST. THOMAS AQUINAS

1. Since some things can be, although they are not, and some things now are; those which can be and are not are said to be in potency, but those which are are said to be in act. But existence is twofold: one is essential existence or the substantial existence of a thing, for example *man exists,* and this is existence *simpliciter.** The other is accidental existence, for example *man is white,* and this is existence *secundum quid.***

2. Moreover, for each existence there is something in potency. Something is in potency to be man, as sperm or the ovum, and something is in potency to be white, as man; and that which is in potency to existence can be called matter: for example sperm is the matter of man and man is the matter of whiteness.

3. But these differ, because that which is in potency to substantial existence is called the matter *from which,* but that which is in potency to accidental existence is called the matter *in which.* Again, properly speaking, that which is in potency to substantial existence is called *prime matter*; but that which is in potency to accidental existence is called the *subject.* The subject gives existence to the accident, namely the act of existing, because the accident has existence only through the subject. Hence we say that accidents are *in a subject,* but we do not say that the substantial form is *in a subject.*

4. Accordingly, matter differs from subject, because the subject is that which does not have existence by reason of something which comes to it, rather it exists *per se**** and has complete existence, just as man does not have existence through whiteness. But that is called matter which has existence by reason of what comes to it, because, of itself, it has incomplete existence; indeed, it does not have any existence, as the Commentator† says in the second book of the treatise *On the Soul.* Hence, simply speaking, the form gives existence to matter; the accident, how-

* absolutely, completely, simply

** relatively, in some respect, in some way

*** by itself

† Averrhoes, a 12th Century Arab who commented extensively on the works of Aristotle.

ever, does not give existence to the subject, rather the subject gives existence to the accident; although sometimes the one is used for the other, namely, matter for subject and conversely.

5. But, just as everything which is in potency can be called matter, so also everything from which something has existence, whether that existence be substantial or accidental, can be called form; for example man, since he is white in potency, becomes actually white through whiteness, and sperm, since it is man in potency, becomes actually man through the soul. Also, because form causes existence in act, we say that the form is the act. However, that which causes substantial existence in act is called substantial form and that which causes accidental existence in act is called accidental form.

6. Because generation is a motion to form, there is a twofold generation corresponding to this twofold form. Generation *simpliciter* corresponds to the substantial form and generation *secundum quid* corresponds to the accidental form. When a substantial form is introduced we say that something comes into being *simpliciter,* for example we say that man comes into being or man is generated. But when an accidental form is introduced, we do not say that something comes into being *simpliciter,* but that it comes into being as this; for example when man comes into being as white, we do not say *simpliciter* that man comes into being or is generated, but that he comes into being or is generated as white.

7. There is a twofold corruption opposed to this twofold generation: *simpliciter* and *secundum quid.* Generation and corruption *simpliciter* are only in the genus of substance, but generation and corruption *secundum quid* are in all the other genera. Also, because generation is a change from non-existence or non-being to existence or being, contrarily, corruption should be from existence or being to non-existence or non-being. However, generation does not take place from just any non-existence, but from the non-being which is being in potency; for example a statue comes to be from bronze which is a statue in potency and not in act.

8. In order that there be generation three things are required: *being in potency* which is matter, *non-existence in act* which is privation, and *that through which something comes to be in act* which is form. For example when a statue is made from bronze,

the bronze which is in potency to the form of the statue is the *matter*; the shapeless or undisposed something is the *privation*; and the shape because of which it is called a statue is the *form*. But it is not a substantial form because the bronze, before it receives the shape, has existence in act and its existence does not depend upon that shape; rather it is an accidental form, because all artificial forms are accidental. Art operates only on that which is already constituted in existence perfected by nature.

9. Therefore there are three principles of nature: matter, form and privation. One of these, form, is that by reason of which generation takes place; the other two are found on the part of that from which there is generation. Hence matter and privation are the same in subject but they differ in definition, because bronze and what is shapeless are the same before the advent of the form; but for one reason it is called bronze and for another reason it is called shapeless. Wherefore, privation is not said to be a *per se* principle, but rather a *per accidens* principle; because it is coincident with matter. For example we say that it is *per accidens* that the doctor builds, because he does not do this insofar as he is a doctor but insofar as he is a builder, which is coincident with being a doctor in the same subject.

10. But there are two kinds of accidents: the necessary, which is not separated from the thing, for example risible in man; and the non-necessary, which can be separated, for example white from man. Thus, although privation is a *per accidens* principle, still it does not follow that it is not necessary for generation, because matter is never entirely without privation. For insofar as it is under one form it has the privation of another and conversely, just as there is the privation of fire in air and the privation of air in fire.*

11. Also, we should note that, although generation is from non-existence, we do not say that negation is the principle but that privation is the principle, because negation does not determine a subject. *Non-seeing* can be said even of non-beings, for example we say that the dragon does not see and we say the same of beings which are not apt to have sight, as stones. But privation is said only of a determined subject in which the habitus is apt to come to be; for example blindness is said only

* In the experimental science of the time of Aristotle and St. Thomas, fire, water, earth and air were the basic elements of which all things were composed.

of those things which are apt to see. Also, because generation does not come to be from non-being *simpliciter,* but from the non-being which is in some subject, and not in just any subject, but in a determined subject, because fire does not come to be from just any non-fire, but from such non-fire as is apt to receive the form of fire; therefore we say that privation is the principle, and not negation.

12. Privation differs from the other principles, because the others are principles both in existence and in becoming. For in order that a statue come to be, it is necessary that there be bronze and, further, that there be the shape of the statue. Again, when the statue already exists, it is necessary that these two exist. But privation is a principle in becoming and not in existing, because until the statue comes to be it is necessary that it not be a statue. For, if it were, it would not come to be, because whatever comes to be is not, except in successive things, for example in time and motion. But from the fact that the statue already exists, the privation of statue is not there, because affirmation and negation are not found together, and neither are privation and habitus. Likewise, privation is a *per accidens* principle, as was explained above, but the others are *per se* principles.

13. Therefore, from what was said, it is plain that matter differs *per se* from form and it differs from privation by definition. Matter is that in which form and privation are understood, just as in bronze the form and that which is shapeless are understood. Still, *matter* sometimes designates privation and sometimes does not designate privation. For example, when bronze becomes the matter of the statue, it does not imply a privation because when I speak of bronze in this way I do not mean what is undisposed or shapeless. Flour, on the other hand, since it is the matter with respect to bread, implies in itself the privation of the form of bread; because when I say *flour* the lack of disposition or the inordination opposed to the form of bread is signified. Also, because in generation the matter or the subject remains, but the privation does not, nor does the composite of matter and privation; therefore that matter which does not imply privation is permanent, but that which implies privation is transient.

14. We should notice, too, that some matter has a composition of form, for example bronze. For, although it is the matter with respect to the statue, the bronze itself is composed of matter and

form. Therefore bronze is not called prime matter, because it has a form. But that matter which is understood without any form and privation, but rather is subject to form and privation, is called prime matter by reason of the fact that there is no other matter before it. This is also called *hyle,* which means *chaos* or confusion in Greek. Also, because all knowledge and every definition comes by way of the form, prime matter cannot be defined or known in itself but only by a comparison with the form; consequently it might be said that that is prime matter which is related to all forms and privations as bronze is to the statue and the shapeless; and this is called first *simpliciter.* A thing can also be called prime matter with respect to some genus, as water with respect to aqueous solutions; this, however, is not first *simpliciter,* because it is composed of matter and form. Hence it has a prior matter.

15. Note, also, that prime matter, and likewise form, is neither generated nor corrupted, because every generation goes from something to something. But that from which generation takes place is matter, and that in which generation terminates is form. Therefore, if matter and form were generated, there would be a matter of matter and a form of form, and so on *ad infinitum.* Hence, properly speaking, there is generation only of the composite.

16. Again, notice that prime matter is said to be numerically one in all things. But to be numerically one can be said in two ways: that which has a determined numerically one form, as Socrates; prime matter is not said to be numerically one in this way, since it does not have in itself a form. Also, something is said to be numerically one because it is without the dispositions which would cause it to differ numerically; prime matter *is* said to be numerically one in this way, because it is understood without all the dispositions which would cause it to differ numerically or without those things by which there is numerical difference.

17. Notice, likewise, that, although prime matter does not have in its definition any form or privation,—for example neither shaped nor shapeless is in the definition of bronze,—nevertheless, matter is never completely without form and privation, because it is sometimes under one form and sometimes under another. Moreover, it can never exist by itself; because, since it does not have any form in its definition, it cannot exist in act, since exist-

ence in act is only from the form. Rather it exists only in potency. Therefore whatever exists in act cannot be called prime matter.

18. From this it is plain, therefore, that there are three principles of nature; matter, form and privation. But these are not sufficient for generation. What is in potency cannot reduce itself to act; for example, the bronze which is in potency to being a statue cannot cause itself to be a statue, rather it needs an agent in order that the form of the statue might pass from potency to act. Neither can the form draw itself from potency to act. I mean the form of the thing generated which we say is the term of generation, because the form exists only in that which has been made to be. However, what is made is in the state of becoming as long as the thing is coming to be. Therefore it is necessary that besides the matter and form there be some principle which acts. This is called the efficient, moving or agent cause, or that whence the principle of motion is. Also, because, as Aristotle says in the second book of the *Metaphysics*, everything which acts acts only by intending something, it is necessary that there be some fourth thing, namely, that which is intended by the agent; and this is called the end.

19. Again, we should notice that, although every agent, both natural and voluntary, intends an end, still it does not follow that every agent knows the end or deliberates about the end. To know the end is necessary in those whose actions are not determined, but which may act for opposed ends as, for example, voluntary agents. Therefore it is necessary that these know the end by which they determine their actions. But in natural agents the actions are determined, hence it is not necessary to choose those things which are for the end. Avicenna gives the following example. A harpist does not have to deliberate about the strings that he will pluck, since these are already determined for him; otherwise there would be a delay between the notes which would cause uneveness. However, it seems more reasonable to attribute deliberation to a voluntary agent than to a natural agent. Thus it is plain, by reasoning *a maiori*, that, if a voluntary agent, for whom deliberation is more proper, sometimes does not deliberate, therefore neither does the natural agent. Therefore it is possible for the natural agent to intend the end without deliberation; and to intend this is nothing else than to have a naturay inclination to something.

20. From the above it is plain that there are four causes: material, efficient, formal and final. But, although *principle* and *cause* are used convertibly, as is said in the fifth book of the *Metaphysics,* still, in the *Physics,* Aristotle gives four causes and three principles; because he takes as causes both what is extrinsic and what is intrinsic. Matter and form are said to be intrinsic to the thing because they are parts constituting the thing; the efficient and final causes are said to be extrinsic because they are outside the thing. But he takes as principles only the intrinsic causes; privation, however, is not listed among the causes because it is a principle *per accidens,* as was said.

21. When we say that there are four causes we mean the *per se* causes, to which all the *per accidens* causes are reduced, because everything which is *per accidens* is reduced to that which is *per se.*

22. And, although Aristotle calls intrinsic causes *principles* in the first book of the *Physics,* still *principle* is applied properly to extrinsic causes, as is said in the fifth book of the *Metaphysics*; *element* is used for those causes which are parts of the thing, namely for the intrinsic causes; *cause* is applied to both. Nevertheless, one is sometimes used for the other: Every cause can be called a *principle* and every principle a *cause.*

23. However, *cause* seems to add something to *principle* as commonly used, because that which is a principle*, whether the existence of a posterior follows from it or not, can be a *principle*; for example the manufacturer is called the principle of the knife because the existence of the knife comes from his operation. But, when something is moved from whiteness to blackness, whiteness is said to be the principle* of that motion; and universally, everything from which motion begins is called a *principle**. However, whiteness is not that from whose existence the existence of a posterior, in this case blackness, follows. Hence we say that a cause is that from whose existence another follows. Therefore that principle from which motion begins cannot really be called a *cause,* even though it may be called a *principle.* Because of this, privation is placed among the principles and not among the causes, because privation is that from which generation be-

* In the sense of *beginning*: That from which anything proceeds in any way whatsoever, whether in being, in becoming or in knowing, as is said in the fifth book of the *Metaphysics.*

gins. But it can also be called a *per accidens* cause insofar as it is coincident with matter, as was said above.

24. *Element,* on the other hand, is applied properly only to the causes of which the thing is composed, which are properly the materials. Moreover, it is not said of just any material cause, but of that one of which a thing is primarily composed; for example we do not say that the members of the body are the *elements* of man, because the members, also, are composed of other things; rather, we say that earth and water are the *elements,* because these are not composed of other bodies, but natural bodies are primarily composed of them.

25. Hence Aristotle says, in the fifth book of the *Metaphysics,* that an element is that of which a thing is primarily composed, which is in that thing, and which is not divided by a form. The explanation of the first part of the definition, *that of which a thing is primarily composed,* is plain from the preceding. The second part, *which is in that thing,* differentiates it from that matter which is entirely corrupted by generation; for example bread is the matter of blood, but blood is generated only by the corruption of bread. Thus bread does not remain in blood; and therefore bread cannot be called an element of blood. But the elements must remain in some way, since they are not entirely corrupted, as is said in the book *On Generation.* The third part, *and which is not divided by a form,* i.e., a species, differentiates an element from those things which have parts diverse in form, i.e., in species, as the hand whose parts are flesh and bone which differ according to species. An element is not divided into parts diverse according to species, rather it is like water whose every part is water. For an element to exist, it need not be undivided by quantity, rather it is sufficient that it be undivided by form. Even if it is in no way divided, it is called an element, just as letters are the elements of words. Thus it is plain from what was said that *principle,* in some way, applies to more than does *cause,* and *cause* to more than does *element.* This is what the Commentator says in the fifth book of the *Metaphysics.*

26. Now that we have seen that there are four genera of causes, we must understand that it is not impossible that the same thing have many causes, for example the statue whose causes are both the bronze and the artist: the artist is the efficient cause while the bronze is the material cause. Nor is it im-

possible that the same thing be the cause of contraries, for example the captain is the cause of the safety of the ship and of its sinking. He is the cause of the latter by his absence and of the former by his presence, as the Philosopher says in the second book of the *Physics*.

27. Also, notice that it is not impossible that the same thing be a cause and the thing caused, not, however, in the same respect, but in diverse ways; for example walking is sometimes the cause of health, as the efficient cause, but health is the cause of the walking, as the end: Walking is sometimes the cause of health and sometimes on account of health. Also, the body is the matter of the soul, but the soul is the form of the body.

28. The efficient cause is called a cause with respect to the end, since the end is actual only by the operation of the agent. But the end is called the cause of the efficient cause, since the efficient cause does not operate except by the intention of the end. Hence the efficient cause is the cause of that which is the end, for example walking in order to be healthy. However, the efficient cause does not cause the end to be the end. Therefore it is not the cause of the causality of the end, i.e., it does not cause the end to be the final cause; for example the doctor causes health to actually exist, but he does not cause health to be the end.

29. Also, the end is not the cause of that which is the efficient cause, but it is the cause of the efficient cause being an efficient cause; for example health does not cause the doctor to be a doctor—I am speaking of the health which comes about by the doctor's activity—but it causes the doctor to be an efficient cause. Therefore the end is the cause of the causality of the efficient cause, because it causes the efficient cause to be an efficient cause. Likewise, the end causes the matter to be the matter and the form to be the form, since matter receives the form only for the sake of the end and the form perfects the matter only through the end. Therefore we say that the end is the cause of causes, because it is the cause of the causality in all causes.

30. Also, we say that matter is the cause of the form, insofar as the form exists only in matter. Likewise, the form is the cause of the matter, insofar as matter has existence in act only through the form; because matter and form are spoken of in relation to each other, as is said in the second book of the *Physics*. They are

also spoken of in relation to the composite, as the part to the whole and as the simple to the composed. Likewise, the composite is spoken of in relation to the parts.

31. But, because every cause, as cause, is naturally prior to that which it causes, notice that we say a thing is prior in two ways, as Aristotle says in the third book of the treatise *On the Soul.* Because of this diversity, we can call something prior and posterior with respect to the same thing, both the cause and the thing caused. We say that one thing is prior to another from the point of view of generation and time, and likewise from the point of view of substance and completeness. Since the operation of nature proceeds from the imperfect to the perfect and from the incomplete to the complete, the imperfect is prior to the perfect, namely, from the point of view of generation and time, but the perfect is prior to the imperfect from the point of view of substance. For example we can say that the man is before the boy according to substance and completeness, but the boy is before the man according to generation and time. But, although in generable things the imperfect is prior to the perfect and potency to act when we consider that in one and the same thing the imperfect is prior to the perfect and potency to act, still, simply speaking, the act and the perfect must be prior, because it is what is in act that reduces potency to act and it is the perfect that perfects the imperfect.

32. Matter is prior to form from the point of view of generation and time because that to which something comes is prior to that which comes to it. But form is prior to matter from the point of view of substance and completeness, because matter has completed existence only through the form. Likewise, the efficient cause is prior to the end from the point of view of generation and time, since the motion to the end comes from the efficient cause. But the end is prior to the efficient cause, insofar as it is the efficient cause, from the point of view of substance and completeness, since the action of the efficient cause is completed only through the end. Therefore these two causes, the material and the efficient, are prior by way of generation, but the form and the end are prior by way of perfection.

33. It must be noted that there are two kinds of necessity: absolute and conditional. Absolute necessity is that which proceeds from the causes prior by way of generation: the material

and the efficient causes. An example of this is the necessity of death which comes from the matter and the disposition of the composing contraries. This is called *absolute* because it does not have an impediment. It is also called the necessity of matter. Conditional necessity, on the other hand, proceeds from causes posterior in generation, namely, the form and the end. For example we say that it is necessary that there be conception if a man is to be generated. This is called *conditional* because it is not necessary simply that this woman conceive, but only conditionally, namely, if a man is to be generated. This is called the necessity of the end.

34. Notice, also, that three causes can coincide in one thing, namely, the form, the end and the efficient cause, as is plain in the generation of fire. Fire generates fire; therefore fire is the efficient cause insofar as it generates; also, fire is the formal cause insofar as it causes to exist actually that which before was in potency; again, it is the end insofar as the operations of the agent are terminated in it and insofar as it is intended by the agent.

35. But the end is twofold: the end of generation and the end of the thing generated, as is plain in the generation of a knife. The form of the knife is the end of generation; but cutting, which is the operation of the knife, is the end of the thing generated, namely, of the knife. Moreover the end of generation sometimes is coincident with the two aforementioned causes, namely, when generation takes place from what is similar in species, as when man generates man and the olive, an olive. But this cannot be understood of the end of the thing generated.

36. Notice, nevertheless, that the end coincides with the form in something which is numerically the same, because that which is the form of the thing generated and that which is the end of generation are the same numerically. But it does not coincide with the efficient cause in a thing numerically the same, but in a thing specifically the same, because it is impossible that the maker and the thing made be numerically the same, but they can be specifically the same. Thus, when man generates man, the man generating and the one generated are numerically diverse, but they are specifically the same. However, matter does not coincide with the others. This is because matter, by the fact that it is being in potency, has the nature of something imperfect; but the other causes, since they are in act, have the nature of some-

thing perfect. However, the perfect and the imperfect do not coincide in the same thing.

37. Therefore, now that we have seen that there are four causes, the efficient, formal, material and final, we must note that any of these causes can be spoken of in many ways. We call one thing a prior cause and another a posterior cause; for example we say that art and the doctor are the cause of health, but art is a prior cause and the doctor is a posterior cause; and it is similar in the formal cause and in the other causes. Notice, also, that we must always bring the question back to the first cause. For example, if it be asked: *Why is this man healthy*?, we would answer: *Because the doctor has healed him.* Likewise, if it be asked: *Why did the doctor heal him*?, we would say: *Because of the art of healing which the doctor has.*

38. Notice, also, that the proximate cause is the same as the posterior cause and that the remote cause is the same as the prior cause. Hence these two divisions of causes into prior and posterior, remote and proximate signify the same thing. Moreover, it must be observed that that which is more universal is always called the remote cause, but that which is more particular is called the proximate cause. For example we say that the proximate form of man is his definition, namely, rational animal; but animal is more remote and substance is still more remote. All superiors are forms of the inferiors.* Again, the proximate matter of the statue is bronze, but the remote matter is metal, and the still more remote is body.

39. Further, there is one cause which is a *per se* cause, another which is *per accidens. Per se* cause is said of one which is the cause of something as such, for example the builder is the cause of the house and the wood is the matter of the bench. *Per accidens* cause is said of one which happens to a *per se* cause. For example we say that the grammarian builds; the grammarian is called the building cause *per accidens,* not insofar as he is a grammarian, but insofar as it happens to the builder that he is a grammarian; and it is similar in the other causes.

40. Likewise, some causes are simple, others are composed. A cause is simple when that alone is said to be the cause which

* This refers to the divisions found within any genus, usually exemplified by the "tree of Porphyry" . . . for example, substance is divided into corporeal and incorporeal, corporeal into living and non-living, etc.

is the *per se* cause, or that alone which is the *per accidens* cause; as if we were to say that the builder is the cause of the house and likewise if we were to say that the doctor is the cause of the house. A cause is composed when both are said to be the cause, as if we were to say that the medical builder is the cause of the house.

41. According to the explanation of Avicenna, that can be called a simple cause also which is a cause without the addition of another; for example bronze is the cause of the statue without the addition of another matter because the statue is made of bronze; and we say that the doctor causes health or that fire heats. But a cause is composed when many things must come together in order that there be a cause; for example not one man, but many are the cause of the motion of a ship; and not one stone, but many are the cause of a house.

42. Again, some causes are in act, others are in potency. A cause in act is one which causes a thing in act, as the builder while he is building or the bronze when a statue is made of it. A cause in potency is one which, although it does not cause a thing in act, can, nevertheless, cause it; thus a builder is a cause, not because he is building, but because he is able to build, and the same is true of bronze when it is not a statue.

43. Note that, in speaking of causes in act, it is necessary that the cause and the thing caused exist at the same time, so that if one exists the other does also. If there is a builder in act, it is necessary that he be building and, if there is building in act, it is necessary that there be a builder in act. But this is not necessary in causes which are only in potency.

44. Moreover, it should be noted that the universal cause is compared to the universal thing that is caused and the singular cause is compared to the singular thing that is caused, for example we say that a builder is the cause of a house and that this builder is the cause of this house.

45. Also, notice that, when we speak of intrinsic principles, namely matter and form, according to the agreement and difference of things that are from principles and according to the agreement and difference of principles, we find that some are numerically the same, as are Socrates and this man—in the Socrates now pointed out; others are numerically diverse and specifically the same, as Sacrates and Plato who, although they differ

numerically, have the same human species; others differ specifically but are generically the same, as man and ass have the same genus *animal*; others are generically diverse and are only analogically the same, as substance and quantity which have no common genus and are only analogically the same, because they are the same only insofar as they are beings. *Being*, however, is not a genus because it is not predicated univocally, but only analogically.

46. In order to understand this last we must notice that something is predicated of many things in three ways: univocally, equivocally and analogically. Something is predicated *univocally* according to the same name and the same nature, i.e., definition, as *animal* is predicated of man and of ass, because each is called *animal* and each is a sensible, animated substance, which is the definition of *animal*. That is predicated *equivocally* which is predicated of some things according to the same name but according to a different nature, as *dog* is said of the thing that barks and of the star in the heavens, which two agree in the name but not in the definition nor in signification, because that which is signified by the name is the definition, as is said in the fourth book of the *Metaphysics*. That is said to be predicated *analogically* which is predicated of many whose natures and definitions are diverse but which are attributed to one same thing, as health is said of the animal body, of urine and of food, but it does not signify entirely the same thing in all three; it is said of urine as of a sign of health, of body as of a subject and of food as of a cause. But all these natures are attributed to one end, namely, to health.

47. Sometimes those things which agree according to analogy, proportion and comparison are attributed to one end, as was plain in the preceding example of health. Sometimes they are attributed to one agent, as medical is said of one who acts with art, of one who acts without art, as a midwife, and even of the instruments; but it is said of all by attribution to the genus which is medicine. Sometimes it is said by attribution to one subject, as *being* is said of substance, quantity, quality and the other predicaments, because it is not entirely for the same reason that substance is *being*, and quality and the others. Rather, all are called *being* insofar as they are attributed to substance which is the subject of the others.

48. Therefore *being* is said primarily of substance and secondarily of the others. Therefore *being* is not a genus of substance and the other predicaments, because no genus is predicated of its species according to prior and posterior; rather, *being* is predicated analogically. This is what we mean when we say that substance and quantity differ generically but are the same analogically.

49. Therefore the form and matter of those things which are numerically the same are themselves likewise numerically the same, as are the form and matter of Tullius and Cicero. The matter and form of those things which are specifically the same and numerically diverse are not the same numerically, but specifically, as the matter and form of Socrates and Plato. Likewise, the matter and form of those things which are generally the same, as the soul and body of an ass and a horse differ specifically but are the same generically; likewise, the principles of those things which agree only analogically or proportionally are the same only analogically or proportionally, because matter, form and privation or potency and act are the principles of substance and of the other genera. However, the matter, form and privation of substance and of quantity differ generically, but they agree according to proportion only, insofar as the matter of substance is to substance, in the nature of matter, as the matter of quantity is to quantity; still, just as substance is the cause of the others, so the principles of substance are all of them principles of the others.

APPENDICES

THE COMMENTARY
of
ST. THOMAS AQUINAS
on
BOOKS I-II
of
THE PHYSICS OF ARISTOTLE

BOOK I

LESSON I

THE MATTER AND SUBJECT OF NATURAL SCIENCE AND OF THIS BOOK. WE MUST PROCEED FROM THE MORE UNIVERSAL PRINCIPLES WHICH ARE MORE KNOWN TO US.

1. Because the Physics, which we here intend to explain, is the first book of natural science, in the beginning of this treatise we should state what the matter and the subject of natural science is. Therefore it must be known that, since every science is in the intellect, we say that something is intelligible in act to the extent that it is abstracted from matter. Thus, insofar as things are diversely related to matter, they pertain to diverse sciences. Further, since every science results from demonstration and since the middle term in demonstration is the definition, it is necessary that the sciences be diversified by the various ways of defining things.

2. Therefore it must be known that there are certain things whose existence depends on matter, nor can these be defined without matter; but there are certain things which, although they cannot exist without sensible matter can be defined without sensible matter. These things differ from one another as *curved* and *snub*. *Snub* exists in sensible matter and sensible matter must be posited in its definition because snub is a curved nose. All natural things are of this sort, for example man, stone, etc. On the other hand, although *curved* can only exist in sensible matter, we do not posit sensible matter in its definition. All mathematical things, as numbers, magnitudes, and figures, are of this sort. There are still other things which do not depend on matter either for existence or in definition; either because they never exist in matter, as God and the other separated substances, or because they are not universally in matter, as substance, potency and act, and being itself.

3. Therefore these latter are treated in metaphysics. Mathematics treats those things which depend on sensible matter for existence, but which are defined without matter. The philosophy

of nature, which is called *Physics,* treats those things which depend on matter, not only for existence, but also in definition. Because everything which has matter is mobile, it follows that *mobile* being is the subject of the philosophy of nature. The philosophy of nature is about natural things; but those things are natural whose principle is nature, and nature is the principle of motion and rest in that in which it is; therefore natural science is about those things which have in themeslves a principle of motion.

4. Because those things which follow something commonly must be treated first and separately, lest we be required to repeat those things many times in discussing all parts of that common aspect, it was necessary, in natural science, that we first have one book in which we treat those things which follow mobile being in general; just as first philosophy, in which we determine those things which are common to being insofar as it is being, is placed before all sciences. This treatise is the book of the *Physics,* which is also said to be *about Physics* or *about Natural Learning* [*Naturalis Auditus*] because it was treated for the listeners in the manner of a doctrine. Its subject is *mobile being* simply. I do not say *mobile body* because in this book we prove that every mobile thing is a body; but no science proves its own subject; therefore, in the beginning of the treatise *On the Heavens,* which follow this one, we begin immediately by explaining the notion of *body.* This present treaties is followed by the other books of natural science in which we treat the species of mobile things; for example in the treatise, *On the Heavens,* we consider the mobile thing according to local motion, which is the first species of motion; in the treatise, *On Generation and Corruption,* we consider the motion to form and the first mobile things, namely the elements, as to their general transmutations; but their special transmutations are treated in the book on *Meteorology.* We consider the inanimate, mixed, mobile things in the treatise *On Minerals,* and we consider animated things in the treatise *On the Soul,* and in the books which follow this latter one.

5. Moreover, The Philosopher first gives an introduction in which he shows the order of proceeding in natural science. Therefore he does two things: first he shows that we should begin from the consideration of principles; secondly that, among

the principles, we should begin from the more universal principles where he says, "The natural way of doing this . . ." First he gives the following argument: In all sciences of which there are principles, causes or elements, understanding and science proceed from the knowledge of principles, causes and elements; but the science which is about nature has principles, causes and elements; therefore, we should begin in this from the determination of principles. When he says *understanding* he refers to definitions, but when he says *science* he refers to demonstrations. For, just as demonstrations are from causes, so also are definitions, since a complete definition is a demonstration differing by position only, as is said in the first book of the *Posterior Analytics.* When he says *principles, causes* or *elements,* he does not mean the same thing. *Cause* applies to more than does *element* because an element is that from which a thing is composed primarily and is in that thing, as is said in the fifth book of the *Metaphysics*; just as letters are the elements of speech, but the syllables are not. However, those things are called causes from which things depend either for existence or for becoming. Thus, those things, which are outside of a thing or which, while they are in the thing, are not those from which the thing is primarily composed, can be called causes; but they are not elements. The term, *principle,* signifies the order of some process. Thus, something can be a principle which is not a cause; just as that from which motion begins is the principle of motion, yet it is not the cause, and the point is the principle of the line, but it is not the cause.

Therefore by *principles* he seems to mean the acting and moving causes where the order of a process is, for the most part, considered. By *causes* he seems to mean the formal and final causes from which things depend, for the most part, for existence and for becoming. By *elements* he seems to mean, properly, the first material causes. Also, he here uses these names disjunctively and not copulatively, in order to designate that not every science demonstrates by all causes because mathematics demonstrates only by the formal cause; metaphysics demonstrates by the formal and final cause, principally, and also by the efficient cause; but the philosophy of nature demonstrates by all the causes. He proves the first proposition of the argument from common opinion, as is done also in the *Posterior Analytics,* be-

cause we think that we know something when we know all its causes, from the first up to the ultimate. Nor should we here take the *causes, elements* and *principles* other than this, as the Commentator* implies, but rather in the same way. He says, *as far as the elements,* because that which is ultimate in knowledge is matter because matter is *for* form, but form is *from* the agent *for* the end, unless it be the end itself; for example we say that the saw has teeth for cutting and they should be of iron so that they are apt for sawing.

Then when he says, "The natural way of doing this . . .", he shows that among the principles we should first determine those which are more universal. First he shows this by an argument; secondly by a sign where he says, ". . . for it is a whole that is best known . . ." For the first he gives the following argument: It is natural for us to proceed in knowing from those things which are more known to us to those things which are more known to nature; but those things which are more known to us are confused, as are universals; therefore we should proceed from universals to singulars.

7. In order to show the first proposition, he brings out the fact that the same things are not more known to us and to nature; rather, those things which are more known to nature are less known to us. Because this is the natural way or order of learning, that we go from that which is known to us to that which is unknown to us, we should proceed from things more known to us to things more known to nature. It must be noted that he says that the known to nature and the known simply are the same. Moreover, those things are more known simply which are more known in themselves. Also, those things are more known in themselves which have more being because each thing is knowable insofar as it has being; but those things are greater beings which are more in act; therefore these are most knowable to nature. But, for us, the converse is true because our knowledge proceeds from potency to act; and the principle of our knowledge is from sensible things which are material and which are

* Averrhoes (Ibn Roschd): A famous Arab doctor and philosopher who was born a Cordova near the beginning of the 12th Century. He was known as *The Commentator* because of his extended commentaries on Aristotle's works. The teaching of the Commentator's "Aristotle" was banned at the University of Paris by the Pope in the time of St. Thomas.

intelligible in potency; therefore these are known to us before we know separated substances, which latter are more known to nature, as is plain in the second book of the *Metaphysics*. Therefore he does not say more known to nature as if nature knew them, but because they are more known in themselves and according to their own nature. Moreover, he says, *more known and more certain*, because in the sciences we are looking, not for just any knowledge whatsoever, but for certain knowledge.

In order to understand the second proposition, it must be known that he here calls *confused* those things which contain something potentially and indistinctly. Because to know something indistinctly is a mean between pure potency and perfect act, when our intellect proceeds from potency to act, that which first comes to it is the confused rather than the distinct; but science is completed in act only when we arrive by resolution at a distinct knowledge of the principles and elements. This is the reason why the confused are known to us before the distinct. Moreover, that universals are confused is evident, because universals contain in themselves their species, in potency, and whoever knows something in the universal knows it indistinctly. But this knowledge is distinct when each of those things which are contained potentially in the universal are known actually because he who knows *animal* knows *rational* only in potency. Moreover, we first know something in potency before we know it actually. Therefore, according to this order of learning by which we proceed from potency to act, *animal* is known to us before *man*.

8. But the Philosopher seems to say the contrary of this in the first book of the *Posterior Analytics*, namely that singulars are more known to us and universals are more known to nature, or simply. But it must be known that there he takes as singulars the sensible individuals themselves, which are more known to us because sense knowledge in us, which is of singulars, precedes intellectual knowledge, which is of universals. But because intellectual knowledge is more perfect, moreover, universals are intelligible in act but singulars are not (since they are material); universals are more known simply and according to nature. However, here he is not speaking of the individuals which are singulars, but rather the species which are more known according to nature insofar as they more perfectly exist and are known dis-

tinctly, but genera are prior known for us, insofar as they are known in potency and confusedly.

But it must be known that the Commentator explains this in another way because he says that where the text says, *The natural way of doing this . . .*, the Philosopher wishes to show the mode of demonstration of this science because it demonstrates from effects and things posterior according to nature, so that, thus, what is said there is to be understood of the process in demonstrating and not of the process in determining. Moreover, where the text says, *Now what is to us plain and obvious . . .*, the Philosopher intends to show, according to the Commentator, those things which are more known for us and less known according to nature, namely those things composed of simple things, meaning by *confused* the composed. Moreover, Aristotle finally concludes that we must proceed from the more universal to the less universal as a corollary. Thus it is plain that the explanation of Averrhoes is not correct because he does not bring the whole under one intention, and because the Philosopher here does not intend to show the mode of demonstration of this science; for he will do this in the second book, according to the order of determining. Also, it is incorrect because *confused* should not be explained as *composed,* but rather as *indistinct*, because this could not be concluded from universals, since genera are not composed of species.

9. Then when the Philosopher says, ". . . for it is a whole that is best known . . .", he shows the proposition by three signs. The first is taken from the integral, sensible whole. He says that the sensible whole is more known to sense; therefore the intelligible whole is also more known to the intellect; but the universal is an intelligible whole because it comprehends many things as parts, namely its inferiors; therefore the universal is more known according to intellect, for us.

But it seems that this proof is inefficacious because it uses *whole* and *part* and *comprehension* equivocally. However, it must be said that the integral whole and the universal whole are alike insofar as each is confused and indistinct because just as he who apprehends the genus does not apprehend the species distinctly, but only in potency, so also he who apprehends a house does not immediately distinguish the parts. Therefore, since the whole is first known for us because of the confusion, the same

thing holds for every whole. However, to be composed is not common to every whole, therefore it is clear that he expressly said above, *confused* and not *composed.*

10. Then when he says, "Much the same thing happens . . .", he gives another sign taken from the integral, intelligible whole. The thing defined is related to the defining principles as a sort of integral whole, insofar as the defining principles are actually in the thing defined; still he who apprehends the name, for example *man* or *circle,* does not immediately distinguish the defining principles; therefore the name is like a sort of whole and is indistinct, but the definition *analyzes this into its particular senses,* i.e. it distinctly gives the principles of the thing defined.

But this seems to be contrary to what he said above because the defining principles seem to be more universal, and he said that the universals are prior known for us. Also, if the thing defined were more known to us than the defining principles, the thing defined would not be made known to us by the definition because nothing is made known to us except from that which is more known to us. However, it must be said that the defining principles in themselves are known to us prior to the thing defined, but the thing defined is known to us before we know that such are the defining principles of it. Just as *animal* and *rational* are known to us prior to *man,* but we know *man* confusedly before we know that *animal* and *rational* are the defining principles of *man.*

11. Then when he says, "Similarly a child begins . . .", he gives a third sign taken from the more universal sensible. Just as the more universal intelligible is more known to us according to intellect, for example *animal* before *man,* so also the more common sensible is first known to us according to sense, for example *this animal* before *this man.* And I mean first according to sense, both according to place and according to time; according to place, because when something is seen from afar we first perceive that it is a body rather than that it is an animal, and we perceive the latter before we perceive that it is a man. Finally we perceive that it is Socrates. Likewise, according to time, the boy first apprehends this individual as a man rather than as this man who is Plato who is his father. This is what he means when he says, *A child begins by calling all men father and all women mother but later on he distinguishes,* i.e. knows determinately,

each of them. From which he shows clearly that we first know a thing confusedly rather than distinctly.

LESSON II

THE OPINIONS OF THE ANCIENT PHILOSOPHERS ABOUT THE PRINCIPLES OF NATURE AND OF BEINGS. IT DOES NOT PERTAIN TO NATURAL SCIENCE TO DISPROVE THE OPINIONS OF SOME OF THESE.

1. Having given the introduction in which he showed that natural science should begin from the more universal principles, here he begins, according to the aforesaid order, to investigate those things which pertain to natural science. This is divided into two parts: in the first of these he determines the universal principles of natural science; in the second he determines mobile being in general, which is treated in this book, and he does this in the third book where he says, "Nature has been defined . . ." The first is divided into two parts: in the first he determines the principles of the subject of this science, i.e. the principles of mobile being as such; in the second he determines the principles of the doctrine and he does this in the second book where he says, "Of things that exist, some . . ." Further, the first of these is divided into two parts: in the first he investigates the opinions of others about the common principles of mobile being; in the second he seeks the truth about these principles where he says, "All thinkers then agree in . . ." About the first he does three things: first he gives the diverse opinions of the ancient philosophers about the common principles of nature; secondly he shows that the investigation of some of these does not concern the philosopher of nature where he says, "Now to investigate whether being . . ."; thirdly he investigates the opinions by proving their falsity where he says, "The most pertinent question with . . ." About the first he does two things: first he gives the diverse opinions of the philosophers about the principles of nature; secondly he shows that there is the same diversity in their opinions about beings where he says, "A similar inquiry is made . . ."

2. He says first therefore that it is necessary that there be either one principle of nature or many and each opinion has its followers.

Some philosophers posited one principle, others posited many. Of those who posited one, some said that it was immobile, as did Parmenides and Melissus, whose opinion will be taken up later; while others, namely the ancient naturalists, said that it was mobile. Of the latter, some said air is the principle of all natural things, as did Diogenes; others said water was this first principle, as did Thales; others designated fire, as did Heraclitus; still others sought this principle in vapor which was a sort of mean between air and water. But none of those who posited only one principle said that this was earth because of the grossity of this latter element. They called such principles mobile because they said that other things came about through the condensation and rarefaction of some one of these.

Of those who posited many principles, some said that these were finite, others said they were infinite. Of those who said that they were finite, but more than one, some said they were two, namely fire and earth, as will be said below when he discusses Parmenides; others said they were three, namely fire, air and water (for they thought that earth was a sort of composite because of its grossity); still others said they were four, as did Empedocles, or even some other number (for even Empedocles himself posited two others, namely friendship and strife, along with the four elements). Those who posited an infinite plurality held diverse opinions. Democritus held that indivisible bodies, which are called atoms, were the principles of all things. But he said that such bodies were all of one genus according to nature, still they differed according to figure and form: and not only did they differ but there was also contrariety between them. For he posited three contrarieties, one according to figure, which is that between curved and straight; another according to order, which is that of prior and posterior; and a third according to position, namely before and after, above and below, right and left. Thus, from these bodies having one nature, he said that diverse things come to be according to a diversity of figure, position and order of the atoms. From this opinion he shows us the opposite opinion, namely that of Anaxagoras who posited infinite principles which were not of one genus according to nature. For, the latter

said that the principles of nature were the infinite, small parts of flesh and bone and others like these, as will be plain below.

It must be noted, however, that he did not divide the many principles according to mobile and immobile because no one who says that the first principles are many could say that they are immobile: for, since all said there was a contrariety among the principles and since contraries are apt to be altered, immobility is inconsistent with plurality of principles.

3. Then when he says, "A similar inquiry is made . . .", he shows that there is the same diversity of opinions about beings. He says that, like the physicists, those inquiring about those things which are, i.e. about beings, ask how many they are; whether, namely, they are one or many; and, if they are many, whether they are finite or infinite. The reason for this is that the ancient physicists knew only the material cause, they barely touched the other causes. Moreover, they said that the natural forms were accidents, as are the artificial forms. Therefore, just as the whole substance of artificial things is their matter, so it followed, according to them, that the whole substance of natural things was their matter. Thus, those who said there was only one principle, as air, thought that other things were substantially air and it was the same for the other opinions. This is what he means when he says that the physicists sought the *ultimate constituents of existing things*: i.e., in seeking principles they sought the material causes from which beings are said to be. Thus it is clear that when they sought to discover whether beings were one or many their investigation is about the material principles which are called elements.

4. Then when he says, "Now to investigate whether Being . . . ", he shows that the refutation of some of these opinions does not concern the philosopher of nature. About this he does two things: first he shows that the refutation of the opinion of Parmenides and Melissus does not pertain to natural science; secondly he gives a reason why it is useful for the present inquiry to refute it where he says, "At the same time the holders of . . ." About the first he does two things: first he shows that it does not pertain to natural science to disprove the preceding opinion; secondly that it does not pertain to natural science to resolve the arguments which are brought forward to prove it where he says, ". . . or like refuting a merely contentious . . ." He manifests the

first by two arguments, the second of which begins where he says, "To inquire therefore whether . . ." Therefore he says first that it does not pertain to natural science to go into this opinion, namely whether being is one and immobile, because it was already shown that there was no difference according to the intention of the ancient philosophers between positing one immobile principle and positing one immobile being. And he shows, by the following, that the refutation of this opinion does not pertain to the philosopher of nature. It is not within the province of geometry to argue against an opinion destroying the principles of geometry; rather this belongs either to some other particular science (if geometry is subalternated to some particular science; as music is subalternated to arithmetic, to which latter it pertains to argue against an opinion denying the principles of music), or it belongs to the common science, namely to logic or metaphysics. But the aforesaid position destroys the principle sof nature because if there is only one being, and *one in such a way,* namely immobile, so that other things cannot come about from it, the very nature of principle is taken away because every principle is the principle of something or of some things. Therefore when a principle is posited multitude follows because the principle is one thing and that of which it is the principle is another; thus, he who denies multitude takes away principles. Therefore the philosopher of nature does not have to argue against this position.

5. Then when he says, "To inquire therefore whether Being . . . ", he shows the same thing by another argument. No science requires that we give arguments against manifestly false and improbable opinions because it is stupid to give careful consideration to something brought up contrary to the opinions of the wise man, as is said in the first book of the *Topics.* This is what he means when he says that to try to investigate whether being is one in such a way, namely immobile, is like disputing against any other improbable position, as that of Heraclitus who said that all things were always moved and nothing was true or against the opinion of one who said that the whole of being is one man, which opinion is certainly entirely improbable. Yet he who says that there is only one immobile being knows how to posit that the whole being is some one [thing]. Thus therefore,

it is clear that it does not belong to natural science to argue against this position.

6. Then, when he says, ". . . or like refuting a merely . . .", he shows that it does not belong to the philosopher of nature even to resolve the arguments of the aforesaid philosophers. He shows this by two arguments, the second of which begins where he says, "We physicists, on the other hand . . ." Therefore he first proves the proposition by the fact that no science is required to resolve the arguments of the sophist which have an evident defect either of form or of matter. This is what he means when he says that it is like giving attention to improbable arguments *or like refuting a merely contentious argument,* i.e. one that is sophistical. Moreover, the arguments of both Melissus and of Parmenides are sophistical: for they sin in matter, whence he says that *their premisses are false,* i.e. they assume as true certain false propositions, and they sin in form, whence he says, *their conclusions do not follow.* But the argument of Melissus is *rather . . . gross and palpable,* i.e. vain and fatuous, and *offers no difficulty,* i.e. it does not raise any doubts: this will be shown below. Moreover, it is not illogical if, when one illogical thing is given, another follows. Thus, therefore, we can conclude that the philosopher of nature is not required to resolve such arguments.

7. Then when he says, "We Physicists, on the other hand, . . .", he gives the second argument proving the same thing which is as follows: In natural science we suppose that natural things are moved *either all or some of them.* He says this because there is a doubt about whether some of them are moved and how they are moved; for example the soul, the center of the earth, the pole of heaven, natural forms and others like these. The fact that natural things are moved can be shown by induction because it is apparent to sense that natural things are moved. Moreover, it is necessary that motion be supposed in natural science, just as it is necessary to suppose nature in the definition of which motion is posited because nature is the principle of motion, as will be said below. Having shown that motion is supposed in natural science, he proceeds further to show the proposition by the fact that not all arguments are to be resolved in some one science, but only those which conclude something false from the principles of that science: whatever is not concluded from the principles of the science, but rather from the contraries

of the principles, is not resolved in that science. This he proves by an example in geometrical things saying: as *squaring the circle by means of segments,* i.e. lunes, is refuted by the geometer because it supposes nothing contrary to the principles of the science. For, certain ones wished to find a square equal to a circle by dividing the circumference of the circle into many parts and supposing that the single parts were straight lines. Thus, by finding some figure, as the rectangle, equal to some one of these figures which were contained by the cutting of the circumference and the chord, and this was true of either many of them or all, they thought that thus they would find a rectilinear figure equal to the whole circle, and then it would be easy to find a square equal to the former by the principles of geometry. Thus they thought they could find a square equal to a circle. But the argument was not sufficient: because although these cuts would exhaust the whole circumference of the circle, still the figures contained by the cuts of the circumference and by the straight lines does not comprise the whole circular surface. But to refute the quadrature of Antiphon does not pertain to geometry because he used the contraries of the principles of geometry. For he described a rectilinear figure in a circle, as a square, and divided the arcs subtended by the sides into two halves and from the mid points drew straight lines to all the angles of the square and thus produced a figure with eight angles in the circle which was more equal to the circle than the square. Likewise, he again divided the arcs subtended by the octagon and, by drawing lines to the angles of the latter, produced a figure with sixteen angles, which approached still more closely the circle. Therefore, by always dividing the arcs and drawing lines to the angles of the previous figure, we get a figure which approaches ever nearer to equality with the circle. Moreover, he said that it is not possible to go on *in infinitum* in the division of the arcs: therefore, we will eventually come to some rectilinear figure which is equal to the circle, which rectilinear figure can then be equated to a square. Therefore, because he supposed that the arc is not always divided into two halves, which is contrary to the principles of geometry, the resolution of this difficulty does not pertain to geometry. Therefore, because the arguments of Parmenides and Melissus suppose that being is immobile, as will be plain below, moreover, this is against the principles supposed in natural sci-

ence, it follows that the resolution of these arguments does not pertain to the philosopher of nature.

8. Then when he says, "At the same time the holders . . .", he gives the reason why he will argue against the preceding opinion. He says that because the aforementioned philosophers spoke about natural things, although they do not raise a *question,* i.e. doubts pertaining to the philosopher of nature, still it is useful to argue against the propositions of such opinions because even though it does not pertain to natural science to argue against such positions, still it does pertain to first philosophy.

LESSON III

THE OPINION OF PARMENIDES AND MELISSUS, WHO ASSERTED THAT EVERYTHING IS ONE BEING, IS REFUTED.

1. After he has stated the opinions of the philosophers about the principles, he here argues against them. First he argues against those who spoke about nature *unnaturally*; secondly those who spoke about nature *naturally,* where he says, "The physicists on the other hand have two . . ." About the first he does two things: first he argues against the position of Melissus and Parmenides; secondly, against their arguments where he says, "Further the arguments they use to prove . . ." About the first he does two things: first he argues against this position, *being is one,* by an argument taken on the part of *being* which is the subject in the proposition; secondly by an argument taken on the part of *one* which is the predicate where he says, "Again, one itself, no less . . ."

2. He says first therefore that that which should be most accepted as a principle for arguing against the preceding position is that that *which is,* i.e. being, is said in many ways. For we must ask those who say that *being* is one in what way they take *being,* namely whether they mean by it substance, quality or some one of the other genera. And, because substance is divided into universal and particular, i.e. into first substance and second substance, and likewise into many species, we must ask whether

they mean that *being* is one as one man, one horse or one soul, or as quality is one, as white and hot and something of that kind, because it makes a great difference which of these is meant. Therefore it is necessary, if *being* is one, that it be either substance and accident together, accident only or substance only. If it is substance and accident together, it will not be only one *being*, but two. Nor will it make any difference in this respect whether substance and accident are together in one thing as one or as diverse because, although they might be together in one thing, still they would not be one simply, but only one in subject. And, by thus positing the substance with accident, it follows that they are not one simply, but many. But, if it be said that the *being* which is one is accident only and not substance, this is entirely impossible. It is absolutely impossible for the accident to exist without substance because all accidents are predicated of substance as of a subject, and their very nature consists in this. But, if it be said that the *being* which is one is substance only, without accident, it follows that it does not have quantity, because quantity is an accident. This is contrary to the position of Melissus because he said *being* is infinite; whence it follows that it is quantified because the infinite, properly [*per se*] speaking, is found only in quantity; substance, quality and such are called infinite only accidentally, namely insofar as they are together with quantity. Therefore, since Melissus said that *being* is infinite, he cannot say that it is substance without quantity. Therefore, if it is substance and quantity together, it follows that it is not one *being* only, but two; but, if it is only substance, it is not infinite, because it will have neither magnitude nor quantity. Therefore in no way can it be true that *being* is one, as Melissus said.

3. Then when he says, "Again, one itself, no less . . .", he gives the second argument taken from the part of *one*. About this he does two things: first he gives the argument; secondly he shows in what way certain ones erred in the solution of it where he says, "Even the more recent of the ancient . . ." He says first therefore that just as *being* is said in many ways, so also is *one*. Therefore we must consider in what way they meant that all things are *one*. For *one* is said in three ways: either as the continuum is *one*, as a line and a body, or as the indivisible is *one*, as a point, or as those things are called *one* whose nature or defi-

nition is *one*, as *liquor* and *strong drink* are called *one*. He therefore shows first that they cannot say that all things are *one* by continuation because the continuum is in a certain way many: for every continuum is divisible *in infinitum* and thus contains in itself many parts. Whence whoever says that being is continuous necessarily says that it is, in a certain way, many.

This is true not only because of the multitude of the parts but also because of the diversity which seems to exist between the whole and the parts. For there is a doubt whether the whole and the parts are one or many. And, although perhaps this doubt does not pertain to the proposition, still, in itself, it is something useful to be known. And this is true, not only of continuous wholes, but also of contiguous wholes whose parts are not continuous, as the parts of a house which are one by contact and composition. It is clear that that which is only relatively a whole [*secundum quid*] is the same as a part, but this is not true of that which is a whole simply [*simpliciter*] because, if the whole simply were the same as one part, by the same argument it would be the same as another part; but those things which are the same as one and the same thing are the same as each other; and thus it follows that both parts, if we say they are simply the same as the whole, are the same as each other. Thus it follows that the whole is indivisible and has no diversity of parts.

4. Then when he says, "But to proceed: If . . .", he shows that all things cannot be *one* as the indivisible is *one* because that which is indivisible cannot be quantified, since every quantity is divisible, and consequently it cannot be qualified, as is understood of quality which is founded on quantity. And, if it is not quantified, it cannot be finite, as Parmenides said, nor infinite, as Melissus said, because an indivisible term, as a point, is an end and non-finite because finite and infinite belong to quantity.

5. Then when he says, "But if all things are one . . .", he shows why all things cannot be called *one* according to definition because, if this were so, three difficulties would follow. The first is that contraries would be *one* according to definition, namely that there would be the same definition for good and evil, just as Heraclitus said that there was the same definition for contraries, as is plain in the fourth book of the *Metaphysics*. The second difficulty is that there would be the same definition for good and non-good because non-good follows evil, and thus it would fol-

low that there would be the same definition for *being* and *non-being*. Then it would follow, also, that all beings would be, not only *one being*, as they say, but also all beings would be *non-being* or nothing because whatever are *one* according to definition are so related that, if one thing is predicated of any of them, it is predicated of the others also. Thus, if *being* and *nothing* are *one* according to definition, it follows that, if all things are *one being*, all things are *nothing*. The third difficulty is that diverse genera, as quantity and quality, are the same according to definition. He states this difficulty where he says, *to be of such-and-such a quality* is the same as *to be of such-and-such a size*.

But it must be noted here that, as the Philosouher says in the fourth book of the *Metaphysics* against those denying principles, we cannot use a simple demonstration which proceeds from the more known simply, but rather we must use a demonstration against the one contradicting, which proceeds from those things which are supposed by the adversary, which are sometimes less known simply. Thus the Philosopher in this argument uses many things which are less known than the fact that it is true that beings are many and not one only, for which he brings forth arguments.

LESSON IV

SHOWING THAT THE LATER PHILOSOPHERS FELL INTO THE ERROR OF THE PRECEDING, NAMELY THAT THE ONE AND THE MANY COULD IN NO WAY COINCIDE.

1. After the Philosopher has disproved the opinion of Parmenides and Melissus saying that being is one, he here shows how, from the same fundamental error, certain earlier philosophers fell into doubts.

Parmenides and Melissus erred because they did not know how to dinstinguish between the various meanings of *one*. Thus, they said that those things, which are one in any way, are one simply. Moreover, the later philosophers, not knowing how to distinguish the one, thought it illogical that the same thing be in

some way one and many. Thus, convinced by arguments, they were forced to admit that all things are one. Therefore he says that the later philosophers *were disturbed*, i.e. they fell into doubt, the same as the ancients, namely Parmenides and Melissus, lest perhaps they be forced to say that the one and the many are the same, which seemed illogical to them. Thus, the first ones saying that all things are one removed the multitude completely, but the later ones tried to take away the multitude only from certain things which they said were one.

2. Therefore certain ones in their propositions, as Lycophron, removed the verb *is* because they said that we must not say *man is white*, but *white man* because they considered that *man* and *white* are in a certain way one, otherwise white would not be predicated of man, but it seemed to them that this word *is*, since it is a verbal copula, made a connection between the two. Therefore, wishing to remove totally the multitude from that which is one, they said that we should not add this verb *is*.

But because this seemed to be an imperfect expression [*oratio*] and seemed to generate an imperfect meaning in the mind of the listener, if we give a noun without adding some verb, others, wishing to correct this, changed the mode of expression and did not say *white man*, because of the imperfection of the expression, nor *man is white*, lest one understand that a multitude is meant, rather they said *man whitens* because by using *whitens* it seemed to them that another thing was not expressed but only a certain transmutation of the subject. Likewise, they said that we should not say *man is walking*, but rather *man walks*, lest by the addition of the verbal copula *is* that which is claimed to be one, namely *white man*, be made to be many, as if one and being were said *in one and the same sense*, i.e. in one way and not in many ways.

3. But this is false because that which is one in one way can be many in another way. For example what is one in subject can be many in definition, as white and musical are the same in subject but are many by definition because the definition of musical is other than the definition of white. Thus we can conclude that the one is many. It also happens in another way that that which is one in a whole and in act is many according to the division of the parts. Whence the whole is one in its totality, but has a multitude of parts. And although for that which is one in subject

and many in definition those, removing the verb *is* or changing it as was said above, might find a solution; still, not knowing how to answer this, namely the one in the whole and parts, they failed entirely and admitted as a difficulty that the one is many. But this is not a difficulty when we do not take the one and many as opposed. The one in act and the many in act are opposed, but the one in act and the many in potency are not opposed. Because of this he adds that the *one* is said in many ways, namely one in potency and one in act. Thus there is nothing to prevent the same thing from being one in act and many in potency, as is plain with the whole and parts.

4. Finally he draws the conclusion principally intended, namely that from the preceding arguments it is plain that it is impossible that all beings are one.

LESSON V

HE RESOLVES THE ARGUMENT OF MELISSUS

1. After the Philosopher has disproved the position of Parmenides and Melissus, here he begins to resolve their arguments. About this he does three things: first he shows in what way their arguments are to be resolved; secondly he resolves the argument of Melissus where he says, "The fallacy of Melissus is . . ."; thirdly he resolves the argument of Parmenides where he says, "The same kind of argument holds . . ."

2. He says first therefore that it is not difficult to resolve the arguments from which Parmenides and Melissus syllogized because both syllogize sophistically, both in the fact that they assume false propositions and in the fact that they do not use the proper form of the syllogism. But the argument of Melissus is *gross and palpable*, i.e. more vain and fatuous, and *offers no difficulty*, i.e. it does not create a doubt, because he assumes what is contrary to natural principles and manifestly false, namely that being is not generated. Whence it is not serious if, given one illogical thing, another follows.

3. Then when he says, "The fallacy of Melissus . . .", he resolves the argument of Melissus. The argument was as follows:

What is made has a principle, therefore what is not made does not have a principle. But being is not made, therefore ot does not have a principle and consequently does not have an end. But what does not have a principle and end is infinite, therefore being is infinite. Moreover, what is infinite is immobile because there is nothing outside itself to which it could be moved. Likewise, what is infinite is one because, if it were many, it would be necessary that there be something outside the infinite. Therefore being is one, infinite and immobile. In order to show that being is not generated Melissus employed an argument which certain philosophers of nature used, therefore, Aristotle explains that argument near the end of this first book.*

4. Aristotle disproves this argument on four counts. First as to the notion *what is made has a principle, therefore what is not made does not have a principle* because this does not follow, but is a fallacy of the consequent. For he argues from the destruction of the antecedent to the destruction of the consequent, while the correct form of argumentation is the converse of this. Whence it does not follow: if what is made has a principle, therefore, if it is not made, it does not have a principle. Rather it would follow that therefore, if it does not have a principle, it is not made.

5. Secondly where he says, "Then it is also absurd . . .", he disproves the preceding argument as to that inference: *it does not have a principle, therefore it is infinite.* Principle is said in two ways: in one way as we say a principle *of time and of generation.* It is in this way that principle is taken when we say, *what is made has a principle or what is not made does not have a principle.* But *principle* is taken in another way when we say the principle of a *thing* or of a magnitude, and only then does it follow: if it does not have a principle, it is infinite. Whence it is plain that he [Melissus] takes the name principle as if it were said in one way. This is what he means when he says that it is illogical to say that the principle of *everything,* i.e. of anything whatsoever having a principle, is the principle of a *thing,* i.e. of a magnitude, and that principle is not said in another way of time and of generation. Still this is not to be understood as if simple generation and that which takes place in an instant, which is true of the induction of form into matter, would have a begin-

* cf. Lesson XIV, n. 2.

ning because there is no beginning of simple generation. But the whole process of alteration, whose term is generation, has a beginning, since it is not instantaneous change, and this process is sometimes called generation because of its term.

6. Thirdly where he says, "Again, does it follow that Being . . .", he disproves the preceding argument as to the third inference by which it was inferred: *it is infinite, therefore it is immobile.* He shows that this does not follow for two reasons: first, in local motion because some part of water can be moved in itself in such a way that it is not moved to an extrinsic place, but only according to congregation and disaggregation of the parts. Likewise, if the whole infinite body were water, it would be possible that its parts be moved within the whole and not go outside the place of the whole. Next he disproves it as to the motion of alteration because nothing prevents the infinite from being altered in whole or in part because it is not for this reason that it is necessary to posit something outside the infinite.

7. Fourthly where he says, "But, further, Being cannot . . .", he disproves the preceding argument as to the fourth inference by which it was concluded, *if being is infinite, it is one.* For it would not follow that it is one according to species, but perhaps, according to matter; just as certain philosophers of nature said all things are one according to matter, but not according to species. For it is evident that man and horse differ according to species; likewise contraries are different from each other according to species.

LESSON VI

THE ARGUMENT OF PARMENIDES IS RESOLVED IN MANY WAYS

1. After the Philosopher has disproved the argument of Melissus, he here disproves the argument of Parmenides. First he disproves it; secondly he throws out the statements of certain ones who argued badly against the reasoning of Parmenides where he says, "Some thinkers did, in point . . ." About the first he does two things: first he gives the ways by which the argu-

ments of Parmenides are to be met; secondly he resolves the argument by these ways where he says, "His assumption that one is . . ."

2. About the first it must be known that the argument of Parmenides was as follows, as is evident in the first book of the *Metaphysics: Whatever is besides being is non-being; but that which is non-being is nothing; therefore whatever is besides being is nothing. But being is one; therefore whatever is besides one [thing] is nothing; therefore there is only one being.* From that he concluded that it would be immobile because it would not have anything from which it would be moved, nor would it have something outside itself by which it would be moved.

From their arguments, it is clear that Parmenides considered being according to the definition of being. Therefore he said being is one and finite. But Melissus considered being on the part of matter because he considered being according as it is made or not made. Therefore he said being is one and infinite.

3. Aristotle says therefore that we use the same mode of proceeding against the argument of Parmenides and against that of Melissus. Just as the argument of Melissus was resolved by pointing out that he assumed false propositions and that he did not conclude correctly according to the correct syllogistic form; so also, the argument of Parmenides is resolved partly because he assumes false premisses and partly because he did not conclude rightly. However, he says that there are also other proper ways of arguing against Parmenides because we can argue against the latter from the propositions which he assumed which are in some way true and probable. But Melissus proceeded from that which is false and improbable, namely that being is not generated. Thus he did not argue with the latter from the assumed propositions.

4. Then when he says, "His assumption that one is . . .", he follows out the aforesaid ways: first, the first; secondly, the second where he says, "His conclusion does not follow . . ." He says first therefore that Parmenides assumes false propositions because he takes *what is*, i.e. being, as something which is said *simply*, i.e. in one way, although it is said in many ways. For in one way substance is called being and in another way accident is called being, and this latter is taken in as many ways as there are diverse genera. We can also take being as it is common to substance and accident. Moreover, it is clear that the proposi-

tions which Parmenides assumes are in one sense true and in another sense false. When he says, *whatever is besides being is non-being,* this is true, if being is taken in the sense in which it is common to substance and accident but, if it is taken for accident only or for substance only, it is false, as will be shown later. Likewise when he says, *being is one,* this is true, if it is taken for one substance or for some one accident, but it will not be true in the sense that whatever is besides that being is non-being.

5. Then when he says, "His conclusion does not . . .", he follows out the second mode of resolution, namely that the argument of Parmenides does not conclude correctly. First he shows this in a similar argument; secondly he adapts this to the proposition where he says, "It is necessary for him, then, to . . ." He says first therefore that we can see that the argument of Parmenides does not conclude correctly from the fact that this argument is not efficacious in all matter; which it should be if it observes the proper form of argumentation. For, if we take *white* in place of *being* and say that white signifies one thing only and is not said equivocally, and then say as follows: *whatever is besides white is non-white and whatever is non-white is nothing*; it does not follow that white is only one thing. First because it will not be necessary that all white things are one *continuum.* Or in another way: *there will not be one white thing by continuation*; i.e. from the fact that it is a continuum, it will not be one simply, because the continuum is in a certain way many, as was said above. Likewise, it will not be one in *definition* because the definition of white is different from that of susceptible. But this does not mean that there will be something besides white, in the sense that it is divided from it. White is not different from susceptible because white is separable from susceptible, but because the definition of white is different from that of susceptible. But this was not considered in the time of Parmenides, namely that something could be one in subject and many in definition. Therefore he believed that, if there is nothing outside of some subject, it follows that that thing is one. But this is false both because of the multitude of parts and because of the diverse definition of subject and accident.

6. Then when he says, "It is necessary for him, then, to . . .", he adapts the similtude to what was proposed, so that what was said of white is shown to apply also to what is said about being.

About this he does two things: first he shows that it does not follow that being is one simply, by reason of the fact that subject and accident are diverse by definition; secondly by reason of the fact of the multitude of parts where he says, "In particular, then, Being will not . . ." About the first he does two things: first he shows that when it is said that *whatever is besides being is non-being*, the *being* cannot be taken for accident only; secondly that it cannot be taken for substance only where he says, "If then, substance is not . . ."

7. He says first therefore that when it is said that *whatever is besides being is non-being*, if *being* is said to signify one thing, it will be necessary that it does not signify just any being whatsoever, or be predicated of any whatsoever, but that it signify that *which truly is*, i.e. substance, and that it signify that *which is truly one*, namely indivisible. For, if being signifies accident, since accident is predicated of a subject, it will be necessary that the subject, to which the accident which is said to be being happens, is not. For, if whatever is besides being is non-being, i.e. besides accident, and the subject is other than the accident which is signified by the name *being*, it follows that the subject is non-being. Thus, since accident which is being is predicated by a subject which is non-being, it follows that being is predicated of non-being. This is what he concludes where he says, *Something therefore which is not will be;* as if he were to say: *Therefore it follows that non-being is being.* But this is impossible because this is the first thing supposed in the sciences, namely that contradictories are not predicated of each other, as is said in the fourth book of the *Metaphysics.* Whence he concludes that, if something is truly being, it follows from the supposition of the proposition *whatever is besides being is no-being* that the *being* is not an accident inhereing in something else because then it would not happen to the subject itself that *it would be some thing*, i.e. that the subject itself would have the definition of being, unless being signified many things so that each of them would be something. But Parmenides supposed that being signifies only one thing.

8. Then when he says, "If, then, substance is not . . .", after he has concluded that when it is said that *whatever is besides being is non-being* the *being* cannot be understood to be accident, he shows that neither can it be understood to be substance

Whence he says: if therefore what truly is is not an accident of something, but that to which something happens, it is necessary that in this proposition *whatever is besides being is non-being* the being, rather than non-being, will signify *that which truly is*, i.e. substance. But this cannot be true because it was maintained that that which is truly being, i.e. substance, is white; but white is not that which truly is because it was already said that it is not possible for that which truly is to happen to something. This is true because that which is not truly, i.e. which is not substance, is not that which is, i.e. it is not being. But whatever is besides being, i.e. besides substance, is non-being. Thus, therefore, it follows that white is not being. And it follows, not only that it is not *this being*, as man is not this being which is an ass, but that it absolutely is not because Parmenides says that whatever is besides being is non-being and that which is non-being is nothing. Therefore it follows from this that non-being would be predicated of that which truly is because white is a predicated of substance which truly is, yet white does not signify being, as was said. Whence it follows that being is non-being; and this is also impossible because one of the contradictories should not be predicated of the other. Whence, if, in order to get rid of this difficulty, we were to say truly that being signifies not only the subject but also white itself, it follows that being signifies many things. Thus, there will not be only one being because subject and accident are many according to their definitions.

9. Then when he says, "In particular, then, being will not . . .", he shows that it does not follow from the argument of Parmenides that there is only one being because of the multitude of parts: first, as to the quantitative parts; secondly, as to the parts of the definition where he says, "Substance is plainly divisible . . ."

He says first therefore that, if being signifies only one thing, not only is it impossible that this be the accident with the subject, but neither will being have some magnitude because every magnitude is divisible into parts. Moreover, each part does not have the same definition but rather is other. Whence it follows that that *one being* will not be a corporeal substance.

10. Secondly where he says, "Substance is plainly divisible . . .", he shows that the *being* cannot be a *definable substance*. For it is clear from the definition that that which truly is, i.e.

substance, is divided into many things each of which is that which truly is, i.e. substance, and each is other according to definition. So that when we say that that *one* which truly is is man, since man is a two-legged animal, it is necessary that animal is and two-legged is and each of these will be that which truly is, i.e. substance. If they are not substances, they will be accidents; either, therefore, accidents of man or of some other thing. But it is impossible that they be accidents of man. In order to show this, he supposes two things. The first is that accident is said in two ways: in one way, as a separable accident which can be in a thing or absent from the thing, as *to sit;* in another way, as an inseparable and *per se* accident. This latter is the accident in whose definition the subject, to which it happens, is posited; for example *snub* is a *per se* accident of *nose* because nose is posited in the definition of snub because snub is a curved nose. The second thing which he supposes is that, if some things are posited in the definition of some defined thing or in the definition of some of those things from which the definition is composed, it is impossible that, in the definition of some one of the latter, the definition of the whole thing to be defined be posited. For example *two-legged* is posited in the definition of *man* and certain other things are posited in the definitions of *two-legged* and of *animal,* from which *man* is defined: but it is impossible that *man* be posited in the definition of *two-legged* or in the definition of some of those things which fall in the definition of *two-legged* or of *animal;* otherwise, the definition would be circular and the prior and posterior, the more known and less known would be the same because every definition is from things prior and more known, as is said in the sixth book of the *Topics.* For the same reason, since *white* is posited in the definition of *white man,* it is not possible that *white man* be posited in the definition of *white.* Having supposed these things, he argues as follows: If *two-legged* is an accident of *man,* it is necessary that either it is a separable accident, and thus it would happen that *man* would not be *two-legged,* which is impossible, or it will be an inseparable accident, and then it will be necessary that *man* be posited in the definition of *two-legged,* which is also impossible because *two-legged* is posited in the definition of *man.* Therefore it is impossible that *two-legged* be an accident of *man,* and the same argument holds for *animal.* But, if it be said that both are

accidents of some other thing, it would follow that *man* also would happen to some other thing. But this is impossible because it was already said above that that which truly is happens to nothing, but *man* was supposed to be that which truly is, as is plain from the above. Moreover, that it would follow that *man* would happen to some other thing, if *two-legged* and *animal* happen to another, is clear from the following: of whatever both particularly, namely *animal* and *two-legged* are said both together, namely *two-legged animal*, will be said of the same, and of whatever *two-legged animal* is said that which is made up of these, namely *man*, will be said because *man* is nothing other than *two-legged animal*. Thus, therefore, it is clear that, if only one being is posited, we cannot posit quantitative parts, neither parts of the magnitude nor parts of the definition. Therefore it follows that every being is an indivisible thing, lest in saying that there is one being we be forced to say it is many because of the parts.

11. However, the Commentator says that, where he says, "If, then, substance is not . . .", he gives the second argument of Parmenides to show that being is one, which is as follows. Being, which is one, is substance and not accident (and by substance he means body); but, if that body were divided into two halves, it follows that being would be said of each half and of that made up of these. And, either this proceeds *in infinitum*, which he says is impossible, or the division will end with a point, which is also impossible. Whence it is necessary that being be one indivisible thing. But this exposition is extorted and is against the meaning of Aristotle, as is sufficiently clear from an examination of the text according to the first exposition.

LESSON VII

THE OPINIONS WHICH STATED THAT NON-BEING IS SOMETHING ARE DISPROVED

1. After the Philosopher has disproved the argument of Parmenides by drawing it out to certain difficulties, he here disproves the position of certain ones who conceded the preceding

difficulties. About this he does two things: first he states their position; secondly he disproves it where he says, "But obviously it is not true . . ."

2. We must consider first therefore that above the Philosopher used two arguments against the argument of Parmenides: one, in order to show that it does not follow from the argument of Parmenides that all things are one because of the diversity of subject and accident, which argument led to the difficulty that non-being is being, as is plain from the above. But the other argument proceeded to show that it does not follow that all things are one because, if this were a magnitude, it would follow that magnitude is indivisible because, if it were divisible, it would be many in a certain way.

3. But the Platonists agreed to both arguments, conceding the impossible things to which they led. Thus they agreed to the first argument which led to the fact that non-being would be being. If anyone says that being signifies one thing, either substance only or accident only, and by this would mean that all things are one, I say they agree to the argument that non-being is being. Moreover, Plato said that accident is non-being and for this reason it is said in the sixth book of the *Metaphysics* that Plato said that Sophistic is about non-being because it deals, for the most part, with those things which are said *per accidens*. Therefore Plato, understanding by being, substance, conceded the first proposition of Parmenides saying that whatever is besides being is non-being because he said that accident, which is outside substance, is non-being. Still he did not concede the second proposition, namely that whatever is non-being is nothing. For, although he would say that accident is non-being, still he did not say that accident is nothing, but that it is something. For this reason it did not follow for him, that being is one only. But he agreed to the other argument which led to the impossibility that magnitude is indivisible, by making magnitudes *indivisible by bisection*, i.e. by saying that the division of magnitudes terminated in indivisibles because he said that bodies are resolved into surfaces, surfaces into lines and lines into indivisibles [points], as is plain in the third book of the treatise *On the Heavens*.

4. Then when he says, "But obviously it is not true . . .", he disproves the preceding position insofar as Plato conceded that

non-being is something. As to that part where he made magnitudes individuals, he offers the refutation in the proper place in the following parts of natural science. He disproves the first in two ways: first by showing that it does not follow from the argument of Plato that non-being is something; secondly as to the fact that he says that unless we posit this [namely that, if non-being which is accident is not something] it follows that all things are one where he says, "To say that all things will be . . ."

5. He says first therefore that it is clear that it is not true that this argument of Plato follows by which he thus deduced that *being signifies one thing* because he said that being is a genus and is said of all things univocally according to participation in the first being. Likewise, he said that contradictories are not true at the same time. From these two propositions he thought that it followed that non-being is not nothing, but is something. For, if being signifies one thing which is substance, it will be necessary that whatever is non-substance is non-being because, if it were being, since being signifies only substance, it would follow that it would be substance. Thus it would be at the same time substance and non-substance, which would mean that contradictories are true at the same time. Therefore, if it is impossible that contradictories be true same time and being signifies one thing which is substance, it would follow that whatever is non-substance is non-being; but something is non-substance, namely accident; therefore something is non-being. Thus it is not true that non-being is nothing.

But Aristotle shows that this does not follow because, if being signifies principally the one thing which is substance, there is nothing to prevent us from saying that accident, which is not substance, is not simply being. Still it is not necessary, for this reason, that that which is not something, i.e. not substance, be called non-being absolutely. Therefore, although accident is not being simply, still it cannot be called non-being absolutely.

6. Then when he says, "To say that all things will be . . .", he shows further that it does not follow that, if non-being which is accident is not something, all things are one. This is what he means when he says that it is illogical to say that it would follow that all things are one unless there is something outside being because by being we can mean only substance, which truly is. But, if substance is, there is nothing to prevent its being many as was already said, even leaving out of consideration magnitude

and accident, because the definition of substance is divided into many which are of the genus of substance, just as *man* is divided into *animal* and *two-legged*. Further, it follows that there are many substances in act according to the diverse differences of the genus. Finally he infers the conclusion principally intended, that not all things are one as Parmenides and Melissus said.

LESSON VIII

THE OPINIONS OF THE PHYSICISTS WHO SPOKE *NATURALLY* ABOUT THE PRINCIPLES

1. After the Philosopher has disproved the opinion of those who spoke *non-naturally* about the principles of nature, here he treats the opinions of those who spoke *naturally* about the principles of nature, i.e. they did not reject motion; therefore he calls them *physicists*, i.e. philosophers of nature. About this he does two things: first he shows the diversity of opinions; secondly he treats one of these where he says, "The theory of Anaxagoras that the principles . . ."

2. He says first therefore that, according to the opinion of the philosophers of nature, there are two ways according to which things are generated from principles. One of these the philosophers of nature touched who said that there is only one material principle; whether this was one of the three elements, namely fire, air and water (because none said that earth alone was the principle, as was said above) or whether it was some mean between these, so that it would be more dense than fire and more subtle than air. Moreover, from this one principle they said all other things were generated according to rarity and density, for example those who said air was the principle said that from the rarefaction of this, fire is generated, but from its condensation water is generated. Moreover, the rare and the dense are contraries and are reduced to excellence and defect as to certain more universal notions because the dense is that which has more matter, but the rare is that which has the least.

3. Thus, in a certain way they agreed with Plato who posited the *great* and the *small* as principles, which two also pertained

to excellence and defect. But they differed from Plato insofar as Plato posited the great and small on the part of matter, and one formal principle which is a certain idea participated in by diverse things according to the diversity of matter. But the ancient naturalists posited contrariety on the part of the form, because they said that the first principle was one matter from which many things are constituted according to diverse forms.

4. But other ancient naturalists said that things came to be from principles by the fact that the contrary and diverse things were extracted from one thing in which they were in some way commixed and confused. But they differed in this, insofar as Anaximander said that that one confused thing was the principle, but not the many which were commixed in it. Whence he said there was only one principle. But Empedocles and Anaxagoras said, rather, that those were principles which were mixed in that one thing. Therefore they said there were many principles, although they also said that that one confused thing was in a certain way the principle.

5. But Anaxagoras and Empedocles differed in two respects: first, because Empedocles posited a certain circulation of commixtion and segregation. He said the world was made many times and corrupted many times, so that when the world was corrupted, since all friendship was thrown together into one, the world would again be generated, with strife separating and distinguishing. Thus distinction follows confusion, and conversely. But Anaxagoras said that the world was made only once, in such a way that from the beginning all things were intermixed in one; but intellect, which began to extract and distinguish, will never cease to do this; so that all things will never again be intermixed in one. They differed in another way, insofar as Anaxagoras said that the principles are infinite parts, similar and contrary, as the infinite parts of flesh which are similar to each other and the infinite parts of bone and of other things which have similar parts, although there is still a contrariety of some parts to others; just as there is a contrariety of the parts of bone to the parts of blood according to the contrariety of moist and dry. But Empedocles posited as principles only those four which are commonly called elements, namely fire, air, water and earth.

LESSON IX

THE OPINION OF ANAXAGORAS ABOUT INFINITE PRINCIPLES IS DISPROVED

1. Having given the diverse opinions of the philosophers of nature about the principles, he here treats one of these, namely the opinion of Anaxagoras, because this opinion seemed to assign a common cause of all species of motion. This is divided into two parts: in the first he sets forth the argument; in the second he raises an objection against it where he says, "Now the infinite *as* infinite is . . ." About the first he does three things: first he states the things which Anaxagoras supposed and from which he argued; secondly he gives the process of the argument where he says, ". . . . for since everything that comes into being . . ."; thirdly he gives a response to a certain tacit objection where he says, "But things, as they say, appear different . . ."

2. Anaxagoras supposed two things from which he proceeded. The first of which was also supposed by all philosophers of nature, namely nothing comes to be from nothing [*ex nihilo nihil fit*]. This is what he means when he says that Anaxagoras seemed to hold that the principles were infinite because he accepted the common opinion of all philosophers of nature as true, namely that that which simply is not in no way comes to be. Because they supposed this as a principle, they came to diverse opinions.

3. In order that they would not be forced to say that something came to be *de novo* which at first was not absolutely, they said that all things at first existed together, either in some one confused thing, as Anaxagoras and Empedocles said; or in some material principle, namely water, fire, air, etc.; or in some mean between these latter. According to this, they posited two modes of production. Those who said that all things preexist together, as in one material principle, said that to come to be was nothing other than to be altered because from that one material principle they said all things come to be by condensation and rarefaction of the same thing. But others who said that all things preexist together, as in some one confused thing and thus as intermixed with many things, said that the coming to be of things is nothing other than congregation and segregation. All these were deceived because they did not know ho wto distinguish between

potency and act, because being in potency is a kind of mean between pure non-beng and being in act. Therefore those things which come to be naturally do not come to be from non-being simply, but from being in potency; but not from being in act, as these held. Thus, those things which come to be do not have to preexist actually, as they said, but only potentially.

4. Then when he says, "Moreover, the fact that the contraries . . .", he gives the second thing which he supposed. He said that contraries come to be from each other because we see that cold comes to be from hot and conversely. From this he concluded that, since nothing comes to be from nothing, one of the contraries preexisted in the other. This is, indeed, true, speaking of the potency, because the cold is potentially hot, but not actually, as Anaxagoras thought because he did not know how to take existence in potency, which is a mean existence between pure non-existence and actual existence.

5. Then when he says, ". . . for, since everything that comes into . . .", he gives the deduction of this argument. Anaxagoras proceeded as follows. If something *comes to be*, it is necessary that it come to be either from being or from non-being. But he excluded one of these, namely that something comes to be from non-being, because of the common opinion of the philosophers cited above. Whence he concluded to the remaining member of the argument, namely that something comes to be from being; for example, if air comes to be from water, that air existed first. But he would not say that air comes to be from water unless air preexisted in water. Whence he held that all that comes to be from something preexisted in that from which it came to be. But, because this appeared to be contrary to what is evident to sense (because it is not evident to the senses that that which is generated from something preexists in the latter), therefore he excluded this objection by saying that that which comes to be from something preexisted in it according to certain very small parts which are insensible to us because of their smallness. For example, if air comes to be from water, there are some very small parts of air in water, but not in that quantity in which it [air] is generated. Therefore by the congregation of these parts of air with each other and their segregation from the parts of water, he said air would come to be. Besides holding this, namely that all that comes to be from something preexists in the latter, he

assumed further that everything comes to be from everything. Thus he concluded that anything was in anything, mixed according to very small and insensible parts. Also, because one thing can come to be from another an infinite number of times, he said that there were an infinite number of very small parts in each thing.

6. Then when he says, "But things, as they say, appear . . .", he [Anaxagoras] excludes a certain tacit objection. Someone could object: If infinite parts of any thing are in anything, it would follow that things do not differ from one another, nor would they appear to differ. In response to this he [Anaxagoras] says that things do seem to differ from each other and are even called by diverse names, by the fact that one thing is superabundant in things; although the multitude of very small parts, which are contained in some mixture, is infinite. Thus, nothing is purely and absolutely white or black or bone, but the nature of each thing seems to be that which is most in each.

7. Then when he says, "Now the infinite *as* infinite is . . .", he disproves the preceding position. About this he does two things: first he disproves it absolutely; secondly he compares it to the opinion of Empedocles where he says, "And it is better to assume a smaller . . ." About the first he does two things: first he gives the arguments for disproving the opinion of Anaxagoras; secondly he disproves the manner of stating the opinion where he says. "The statement that complete separation . . ." With respect to the first he gives five arguments. The first is as follows: Every infinite is unknown, according as it is infinite. He explains why he says *according as it is infinite* because, if it is infinite according to multitude or magnitude, it will be unknown according to quantity; but, if it is infinite according to species, for example such that it is constituted from infinite things diverse according to species, then it will be unknown according to quality. The reason is that that which is known by the intellect is comprehended by the latter as to all the things which belong to it, but this is impossible in some infinite thing. Therefore, if the principles of some thing are infinite, they will have to be unknown either according to quantity or according to species. But, if the principles are unknown, the things which are from the principles must be unknown. He proves this by the fact that we think we know any composed thing when we know from what and from how many

a thing is, i.e. when we know both the species and the quantity of the principles. Therefore it follows from the first to the last that, if the principles of natural things are infinite, natural things will be unknown, either according to quantity or according to species.

8. He gives the second argument where he says, "Further if the parts . . .", which is as follows: If the parts of some whole do not have some determinate quantity, whether in magnitude or in smallness, but rather are of any quantity whatsoever either according to magnitude or smallness; it is necessary that the whole does not have a determined magnitude or smallness, rather the whole can be of any magnitude or smallness whatsoever. This is true because the quantity of the whole arises from the parts. (However, this must be understood of the parts actuallly existing in the whole, as flesh, nerves, and bone exist in the animal. This is what he means when he says: *I mean components into which, since they are actually present in it, the whole can be divided.* By this he excludes the parts of the whole continuum which are only in the latter potentially.) But it is impossible that an animal, plant or something of this kind be related indeterminately to whatever magnitude or smallness because there is some quantity so great that the quantity of no animal extends beyond this, and there is a limit in the other direction beyond which no animal is found; and the same is true of plants. Therefore it follows from the destruction of the consequent that neither are there some of the parts which have an indeterminate quantity because there is a similarity between the whole and the parts. But flesh and bone and such are the parts of the animal, and the fruit, etc., are the parts of plants. Thus it is impossible that flesh, bone and the like have an indeterminate quantity, either according to greater or lesser. Therefore it is not possible that there are some parts of flesh or bone which are insensible because of their smallness.

9. It seems that what is here said is contrary to the division of the continuum *in infinitum*. For, if the continuum is divisible *in infinitum* and flesh is a certain continuum, it seems that it [flesh] is divisible *in infinitum*. Therefore the part of flesh, taken according to infinite division, transcends every determinate minimum. In reply, it must be said that, although a body, taken mathematically, is divisible *in infinitum*, still no natural body is

divisible *in infinitum*. For, in the mathematical body we consider only quantity, in which we find nothing repugnant to division *in infinitum*; but in the natural body we consider the natural form which requires a determinate quantity, just as it also requires the other accidents. Whence we do not find quantity in a species of flesh except as determined under some terms.

10. He gives the third argument where he says, "Again according to the theory . . ." About this he does two things: first he states certain things from which he argues; secondly he gives the deduction of the argument where he says, "For, let flesh be extracted from. . ." About the first he proposes three things. The first is that, according to the position of Anaxagoras, all things are together, as was said. From this he intends to deduce a difficulty because Anaxagoras, as was said, held that all *such things*, namely those which are composed of similar parts, as flesh, bone and the like, exist in each other and do not come about *de novo*, but are segregated from something in which they preexist. But each is denominated *by its chief constituent*, i.e. by that having the most parts existing in the thing. The second point is that anything comes to be from anything, as water comes from flesh by segregation, and likewise, flesh from water. The third is that every finite body *is exhausted by the repeated abstraction of a finite body*, i.e. if, from some finite body however great, we take away many times a finite body, however small, the lesser can be taken away from the greater so many times that the greater whole will be consumed by the lesser through division. Moreover, from these three propositions he concludes what was principally intended, namely that each thing is not in each other thing, which is contrary to the first of these three positions. For such is the result in arguments leading to the impossible, that we finally conclude to the destruction of some of the premisses.

11. Then when he says, "For, let flesh be extracted . . .", he deduces the argumentation, and he assumes what is concluded in the preceding argument. He says that, if flesh is removed from water (namely when flesh is generated from water) and if, likewise, from the remaining water we have a further segregation of flesh, still, while there always remains a lesser quantity of flesh in water, the magnitude of flesh does not *fall below a certain magnitude*, i.e. we will find some small measure of flesh below which there will not be some smaller portion of flesh, as is clear

from the argument above. Given the fact that there is some small portion of flesh below which there is none smaller, he shows the following: If some flesh is segregated from water and then again some more flesh, either this segregation will come to an end or it will not. If it comes to an end, then there will be no flesh in the remaining water; and thus anything will not be in anything. But, if it does not come to an end, then there will always be some part of flesh in the water; still, in such a way, that in the second segregation it is less than in the first, and in the third, less than in the second. And, since we cannot go on getting smaller parts beyond a certain limit, as was said, these minimum parts of flesh will be equal and infinite in number in some finite portion of water; otherwise, we would not have segregation *in infiinitum*. Therefore it follows, if the segregation does not have a term but rather we remove flesh from water *in infinitum*, that in some finite magnitude, namely water, there are certain things finite according to quantity and equal to each other, and infinite in number, namely the infinite minimum parts of flesh. This is impossible and is contrary to what was posited above, namely that every finite body is exhausted by abstracting some finite body. Therefore, also the first was impossible, namely that anything is in anything, as Anaxagoras posited.

12. Moreover, we must consider that it was not without reason that the Philosopher said *equal* in this last difficulty to which he concluded. For there is no difficulty in finding infinite unequal parts in some finite thing, if we consider only the nature of quantity because, if the continuum is divided according to the same proportion, we can proceed *in infinitum*; for example, if we take a third of the whole, and a third of the third, etc. However, the parts will not be equal in quantity. But, if the division is made with equal parts, we cannot proceed *in infinitum*; not even if we consider only the nature of quantity in the mathematical body.

13. He gives the fourth argument where he says, "Another proof may be . . .", which is as follows: Every body, when something is removed, becomes less, since every whole is greater than its part; but, since the quantity of flesh is determined according to magnitude and smallness, as is plain from what was said, it is necessary that there be some minimum amount of flesh; therefore something cannot be further segregated from this because

then there would be something less than the minimum. Therefore anything cannot come to be from anything by segregation.

14. He gives the fifth argument where he says, "Lastly in each of his infinite bodies . . .", which is as follows: If there are infinite parts of each thing in each, and anything is in anything, it follows that in infinite bodies there are infinite parts of flesh and infinite parts of blood or of brain matter. Also, however much is separated from the original, these still remain there. Therefore it would follow that infinites are in infinites an infinite number of times, which is irrational.

15. Then when he says, "The statement that complete separation . . .", he disproves the preceding position of Anaxagoras as to the manner of positing it. He does this in two ways: first, because he did not understand his own position; secondly, because he did not have a sufficient motive for positing it where he says, "Nor is Anaxagoras right about . . ." Thus, he says first that, insofar as he said that segregation never comes to an end, he did not know what he should say, although in some way what he said was true because accidents can never be separated from the substances; still, he posited an intermixing, not only of bodies, but also of accidents. For when something becomes white, he said that this takes place by the abstraction of whiteness which was first intermixed. Thus, if colors and other accidents of this kind are said to be intermixed, as he said, and, if someone, supposing this, were to say that all things which are intermixed can be segregated; it would follow that what is white and healthy would not have a subject about which they are said and in which they would exist, which is impossible. Therefore it remains true that not all things intermixed can be segregated, if accidents are also intermingled. From this another difficulty follows because Anaxagoras said that all things in the beginning were intermixed, but intellect began to segregate them. But any intellect that would seek to do that which is impossible to do is an illogical intellect. Whence this intellect, which would intend to perform the impossible, would be illogical *if* [*it*] *is supposed to wish, i.e.* if it actually desired, to segregate these things because this is impossible both quantitatively, because there is no minimum magnitude as Anaxagoras said, rather something can be taken away from any minimum, and qualitatively, because accidents are not separable from their subjects.

16. Then when he says, "Nor is Anaxagoras right about . . .", he disproves the preceding position, insofar as it was posited without sufficient motive. For, because Anaxagoras saw that something became great from the gathering together of many similar, small parts, as the stream from many rivulets, he believed this was true in all things. Therefore Aristotle says that he did not rightly grasp the generation of similar species, i.e. that something must always be generated from things similar in species. For, some things are generated from similar things and are resolved into similar things, as clay is divided into clay, but, in certain things, this is not so, but rather certain things are generated from things which are dissimilar. And, even in these, there is not just one mode because some things come to be from dissimilar things by alteration, as bricks come, not from bricks, but from clay. But some things come from dissimilars by composition, as a house comes from bricks and not from houses. It is in this way that air and water come to be from one or the other, i.e. as from dissimilars. Another translation says, *as bricks from a house*. According to this he gives a twofold way in which something comes from dissimilars, namely by composition, as a house comes to be from bricks, and by resolution, as bricks come to be from a house.

17. Then when he says, ". . . and it is better to assume . . .", he disproves the opinion of Anaxagoras by comparison to the opinion of Empedocles. He says that it is better to make the principles fewer and finite as Empedocles did, than many and infinite as Anaxagoras did.

LESSON X

THE CONTRARIETY OF THE FIRST PRINCIPLES ACCORDING TO THE ANCIENTS

1. Having given the opinions of the ancient philosophers about the principles of nature, he here begins to inquire about the truth of the question. First he seeks it disputatively, proceeding from probable notions; secondly he determines the truth by demonstration where he says, "We will now give our own ac-

count . . ." About the first he does two things: first he inquires about the contrariety of principles; secondly about their number where he says, "The next question is whether . . ." About the first he does three things: first he gives the opinion of the ancients about the contrariety of principles; secondly he deduces the reason for this where he says, "And with good reason. For . . ."; thirdly he shows how the philosophers stood in positing contraries as principles where he says, "Up to this point we have practically . . ."

2. He says first therefore that all the ancient philosophers posited a contrariety in the principles. He shows this by three opinions of the philosophers. For, some said that the whole universe is one immobile being. Of these, Parmenides said that all things are one according to reason but are many according to sense; and, insofar as they are many, he posited contrary principles in these, as hot and cold, and he attributed the hot to fire and the cold to earth. The second opinion was that of the natural philosophers who posited one mobile material princple. They said that other things came to be from this according to rarity and density, and thus they posited the rare and dense as principles. The third opinion is that of those who posited many principles. Among the latter, Democritus said that all things came to be from indivisible bodies which, when joined to each other, left a certain vacuum in the contact; and he called such vacuums, pores, as is plain in the first book of the treatise *On Generation and Corruption*. Thus, therefore, he said that all bodies are composed of the *firm* and the *empty*, i.e. the full and the void. Whence he said that the principles of nature were the full and the void, but he attributed the full to being and the void to nonbeing. Also, although all indivisible bodies were of one nature, still he said that diverse things were constituted from these according to a diversity of figure, position and order. Whence he said that there were contrary principles which were in the genus of position, namely above and below, before and after; and contraries which were in the genus of figure, namely straight, angular, and circular; and likewise, contraries which were in the genus of order, namely prior and posterior, which he did not mention in the text because they are evident. Thus he concludes by induction that all philosophers said that the principles were contraries in some way. Moreover, he does not mention the opin-

ion of Anaxagoras and Empedocles because he has explained these at length above. However, even these latter posited, in some way, a contrariety in the principles when they said that all things come to be by congregation and segregation, which latter agree in genus with the rare and the dense.

3. Then when he says, "And with good reason. For . . .", he gives a probable reason to show that first principles are contraries, which is as follows. There seem to be three things fundamental to the nature of principles: first that they are not from others; secondly that they are not from one another; thirdly that all other things are from them. But these three attributes belong to the first contraries. Therefore the first contraries are principles. In order to understand what he means by *first contraries,* we must consider that there are certain contraries which are caused by other contraries, as sweet and bitter are caused by moist and dry and by hot and cold. But we cannot thus proceed *in infinitum,* but must come to some contraries which are not caused by other contraries, and these latter he calls first contraries. The three preceding conditions of principles belong, therefore, to these first contraries. For, from the fact that they are first, it is clear that they are not from others; from the fact that they are contraries, it is clear that they are not from one another because, although cold comes to be from hot, insofar as that which first is hot afterwards becomes cold, still, the frigidity itself never comes to be from heat, as will be said afterwards. As to the third point, how all things come to be from contraries, we must examine it more carefully.

4. Therefore, in order to show this, he says first that neither action nor passion can take place between *any other things,* i.e. between those things which just happen to be together, or *at random,* i.e. between things undetermined in any way whatsoever. Nor can just anything come to be from just anything, as Anaxagoras said, except perhaps accidentally. This is shown first in simple things because white does not come to be from musical except perhaps accidentally, insofar as to be white or black happens to musical. But white comes to be *per se* from non-white, and not from just any non-white whatsoever, but from the non-white which is black or some color in between. Likewise, musical comes to be from non-musical; and not from just any non-musical whatsoever, but from the opposite which is called im-

musical, i.e. that which is apt to be musical but is not musical, or from whatever is between these opposites. For the same reason something is not corrupted primarily and *per se* into anything at random. For example white is not corrupted into musical, except accidentally, but it is corrupted *per se* into non-white; and not into just any non-white whatsoever, but into black or some color in between. And he says the same of the corruption of musical and of others which are similar. The reason is that everything, which comes to be or is corrupted, is not, before it comes to be, and is not, after it is corrupted. Whence it is necessary that that, which something comes to be *per se* and into which something is *per se* corrupted, be such that it includes in its very definition the non-existence of that which it comes to be or that into which it is corrupted. He shows this similarly in composed things. He says that we find the same in composed things as was true of the simple things mentioned above, but it is more hidden in composed things because their opposites are not named, as are the opposites of simple things, because the opposite of a house is not named, as is the opposite of white. Thus, if we reduce these composed things to something named, it will be evident because every composite consists in some harmony; but the harmonious comes to be from the unharmonious, and the unharmonious from the harmonious. Likewise, the harmonious is corrupted into the unharmonious, and not into just any kind whatsoever, but into the opposite. Moreover, unharmonious can be said either according to order only or according to composition because some wholes consist in the harmony of order, as an army, but others consist in the harmony of composition, as a house; and the same thing is true of both. Also, it is clear that all composed things come to be similarly from the uncomposed, just as a house comes to be from what is uncomposed, and the figured from the unfigured; and in all these we consider only order and composition. Thus, by induction, it is clear that all things which come to be or are corrupted come to be from contraries or means, or are corrupted into these. Moreover, means come to be from contraries as the colors in between come to be from white and black. Whence he concludes that all things which come to be according to nature either are contraries, as white and black, or come to be from contraries, as do the things in between. And this is what he principally intended to con-

clude, namely that all things come to be from contraries, which was the third condition of principles.

5. Then when he says, "Up to this point we have . . .", the Philosopher here shows in what way the philosophers said that principles were contrary: first, as to their motives for positing these; secondly, as to the position itself where he says, "They differ, however, from one . . ."

He says first therefore that, as was said above, many philosophers followed the truth up to the point where they said that the principles are contrary. They stated this truly, not as if they were moved to posit it because of some reason, but because they were forced by the truth itself, because the true is the good of the intellect, toward which it is naturally ordered. Whence, just as things lacking cognition are moved to their ends without reason, so, occasionally, the intellect of man tends toward truth by a certain natural inclination, even though it does not see the reason.

6. Then when he says, "They differ, however, from one . . .", he shows how the preceding philosophers stood on the position itself. About this he does two things: first he shows how they differed in saying that the principles are contrary; secondly how they differed and agreed at the same time where he says, "Hence their principles are in one sense . . ."

He says first therefore that the philosophers who said that the principles are contrary differed in two ways: first, because some, taking a rational position, accepted the prior contraries as principles; but others, more short-sighted, accepted posterior contraries as principles. Also, of those who accepted the prior contraries, some considered those things which were more known according to reason; but others, those things which are more known to sense. Or we can say that the reason of the first difference is given by this second difference because those things which are more known according to reason are simply prior; but those which are more known according to sense are simply posterior and are prior for us. Moreover, it is clear that principles must be first. Whence those who judged the prior according to that which is more known to reason said that the principles were those contraries which were prior simply, but those who judged the prior according to that which is more known to sense said that the principles were those which were posterior simply.

Whence some said that hot and cold were the first principles, but others said the moist and the dry. Both of these are more known according to sense; still, hot and cold, which are active qualities, are prior to moist and dry, which are passive qualities because the active is naturally prior to the passive. But others posited as principles the more known according to reason. Some of these posited as principles the odd and even, namely the Pythagoreans who thought that the substance of all things was number and that all things are composed of odd and even, as from form and matter. They attributed infinity and alterity to the even because of its divisibility, but they attributed finitude and identity to the odd because of its lack of division. But some posited love and strife as the causes of generation and corruption, namely the followers of Empedocles, because these are also more known according to reason. When it is plain that the aforesaid diversity appears in those positions.

7. Then when he says, "Hence, their principles are in one sense . . .", he shows in what way there is a certain agreement in the differences of the preceding positions, concluding from the preceding that in a way the ancient philosophers called the same things principles and in a way they called different things principles. They nominated different things according as they assumed diverse contraries, as was said. They designated the same things according to analogy, i.e. according to proportion, because the principles accepted by all have the same proportions. This is seen in three ways: first, because whatever they took as principles were related to each other as contraries. This is what he means when he says that all accepted principles *from the same table of columns,* i.e. the list of contraries, because all accepted contraries as principles, but diversely. Nor is it wonderful, if they took diverse principles from the table of contraries, because, among contraries, some are containing, as the prior and more common, some are contained, as the posterior and less common. Thus, this is one way in which they spoke similarly, insofar as all took the principles from the table of contraries. Another way in which they agreed analogously is that, whatever principles they took, one of these was better and the other was worse; just as love, the full or hot was better, but strife, the vacuum or cold was worse; and the same distinction was considered in the other contraries. This was true because one of the contraries always

had an admixture of privation, because the principle of contrariety is the opposition of privation and *habitus,* as is said in the tenth book of the *Metaphysics.* The third way in which they agreed analogously was that all accepted the more known principles, but some took the more known according to reason, others the more known according to sense because since reason is of the universal, but sense, of the particular, the universals are more known according to reason, as the great and the small, but the singulars are more known according to sense, as the rare and the dense which are less common. Thus finally, summing up, he concludes what was principally intended, namely that the principles are contrary.

LESSON XI

THE PRINCIPLES OF NATURAL THINGS ARE NOT FEWER NOR MORE THAN THREE

1. After the Philosopher has investigated the contrariety of the principles, he here begins to inquire about their number. About this he does three things: first he raises the question; secondly he excludes those things which do not fall under the question where he says, "One they cannot be, for . . ."; thirdly he treats the question itself where he says, "Granted, then, that they are . . ." He says first therefore that after the inquisition about the contrariety of principles, we must follow with an investigation as to their number, namely whether they are two, three or more.

2. Then when he says, "One they cannot be, for . . .", he excludes those things which do not fall under the question: first, that there is not just one principle; secondly, that they are not infinite where he says, "Nor can they be innumerable . . ." He says first therefore that it is impossible that there be only one principle because it was shown that the principles are contrary; but contraries are not one only, because nothing is contrary to itself; therefore the principles are not one only.

3. Then when he says, "Nor can they be innumerable . . .", he shows that the principles are not infinite by four arguments. The

first is as follows: The infinite, as such, is unknown; therefore, if the principles are infinite, they would have to be unknown; but, if the principles are unknown, those things which are from the principles would be unknown; therefore it follows that nothing in the world would be known.

4. He gives the second argument where he says, ". . . and in any one genus there is . . .", which is as follows: The principles must be the first contraries, as was shown above; but the first contraries are in the first genus which is substance; but substance, since it is one genus, has one first contrariety because the first contrariety of any genus is that of the first differences by which the genus is divided; therefore the principles are not infinite.

5. He gives the third argument where he says, ". . . also a finite number is sufficient . . .", which is as follows: What can come to be by finite things must be posited to come about by finite things rather than by infinite things; but the explanation of all those things which come to be according to nature was given by Empedocles by means of finite principles, just as it was explained by Anaxagoras by infinite principles; therefore the principles must not be posited as infinite.

6. He gives the fourth argument where he says, "Lastly, some contraries are more primary . . .", which is as follows: The principles are contraries; therefore, if the principles are infinite, all contraries must be principles; but not all contraries are principles. This is evident for two reasons: first, because the principles must be the first contraries, but not all contraries are first, since some are prior to the others; secondly, because the principles must not be from one another, as was said above; but some contraries come to be from one another, as sweet and bitter, and white and black. Therefore the principles are not infinite. Thus he concludes, finally, that the principles are not one only, nor infinite.

7. Moreover, we must consider that the Philosopher here proceeds disputatively from probable premisses, since he assumes those things which seem to be true to many, and thus which cannot be entirely false but are true in part. Therefore it is true, in a certain way, that contraries come to be from each other, as was said, if we take the subject with the contraries, because that which is white, afterwards becomes black; still, the whiteness

itself is not converted into blackness. But some of the ancients said that the first contraries did not come to be from each other even taking the subject with these. Whence Empedocles denied that the elements come to be from each other. Thus Aristotle here expressly does not say that hot comes to be from cold, but rather, that sweet comes from bitter and white from black.

8. Then when he says, "Granted, then, that they are . . .", he treats what was in the question, namely how many the principles are. About this he does two things: first he shows that there are not just two principles, but three; secondly he shows that there are not more where he says, "On the other hand, the view that they are more than three . . ."

About the first he does two things: first he shows by arguments that the principles are not two only, but rather we must add a third; secondly he shows that in this respect the ancient philosophers agreed where he says, "If then we accept both the former argument . . ."

9. He gives three arguments for the first. He says first therefore that, since it was shown that the principles are contrary and thus cannot be one only, but at least two, nor can they be infinite, it remains to consider whether they are only two or more than two, because, by the fact that it was shown above that the principles are contrary, it seems that there are only two principles, because contrariety is between two extremes. But in this there is *a difficulty*, i.e. a doubt, because other things must come to be from the principles, as was said above. But, if there are only two contraries as principles, it is difficult to see how all things could come to be from these two because we cannot say that one of these produces something from the remaining one, because density is not apt to convert rarity, itself, into something, nor rarity, density. It is the same with any other contrariety because love does not move strife and make something from the latter, nor conversely. But each of the contraries changes some third thing, which is the subject of both because hot does not make frigidity, itself, hot, but rather the subject of the frigidity; and conversely. Thus, it seems that we must posit some third thing which is the subject of the contraries in order that other things can come to be from the contraries. Nor is it important for that which at present concerns us whether that subject is one or more. Some posited many material principles

from which they prepared the nature of beings because they said that the nature of things was only matter, as will be said below in the second book.

10. He gives the second argument where he says, "Other objections to the view that . . ." he says that, unless we suppose something other than the contraries which are posited as principles, a greater difficulty than the preceding arises because the first principle cannot be some accident said of a subject. For, since the subject is the principle of the accident because the latter is predicated of the former and the subject is naturally prior to the accident, it would follow, if the first principle were an accident predicated of a subject, that there would be a principle of a princple, and that there would be something prior to the first. But, if we say that contraries alone are principles, the principle must be some accident said of a subject because the substance of no thing is contrary to another, rather contrariety is found only between accidents. Therefore it remains that contraries alone cannot be the principles. Moreover, we must consider that in this argument he uses that which is *predicated* for *accident* because the predicate designates the form of the subject, but the ancients believed that all forms are accidents. Also, he here proceeds disputatively from probable propositions which were renowned among the ancients.

11. He gives the third argument where he says, "Again we hold that . . .", which is as follows: Everything which is not a principle should be from principles; therefore, if contraries alone are principles, it would follow that, since substance is not contrary to substance, substance is from non-substances. Thus, what is not substance would be prior to substance because what is from some things is posterior to these. But this is impossible because substance, which is being *per se*, is the first genus of being. Therefore it cannot be that contraries alone are the principles; we must posit some other third being.

12. Then when he says, "If, then we accept both the former argument . . .", he shows how the position of the philosophers agreed also in this respect. About this he does two things: first he shows how they posited one material principle; secondly how they posited besides this two contrary principles where he says, "All however, agree in this, that they . . ." Moreover, about the first we must consider that the Philosopher, in the preceding, was

seen to oppose each opposite part, as is the custom of those disputing. First he proved that principles are contrary, and now he brings forward arguments to prove that contraries are not sufficient in order that things be generated from them. And, because disputative arguments conclude the truth in some respect, although not entirely, he concludes one truth from both arguments. He says that, if someone thinks the prior argument which proved that principles are contrary is true and also this last which is posited, which proves that contrary principles cannot suffice, in order to save both, it is necessary to say that a certain third thing subsists in the contraries, as those said who posited that the whole universe is some one nature, meaning by nature matter; as water, fire, air or a mean between these as vapor or the like. Also, this seems to be more true of some mean because this third thing is said to be the subject of contraries and to be, in a certain way, distinct from them. Whence that which has less of contrariety is more fitting posited as the third principle besides the contraries because fire, earth, air and water have an annexed contrariety, namely hot and cold, moist and dry. Hence they very plausibly made the subject something other than these, something, namely, in which there is less of the excellence of contraries. After these thinkers, those who said that air is the principle had the better notion because contrary qualities which are less sensible are found in air. After these, we have those who said that water is the principle. Those who said that fire is the principle had the worst notion, insofar as fire has the most sensible and more active contrary quality because it has in itself the excellence of heat, although, if we compare the elements according to subtlety, those who said that fire is the principle seem to have spoken best, as is said in another place, because whatever is more subtle seems to be simpler and prior. For this reason none posited earth as a principle because of its grossity.

13. Then when he says, "All, however, agree in this, that . . .", he shows how, with one material principle, they posited contrary principles. He says that all positing one material principle said that that was figured or formed by certain contraries, as rariety and density, which are reduced to the great and the small and to excellence and defect. Thus, what Plato posited, that the one and the great and the small are principles, was also the opinion of the ancient naturalists, but in a different way because the an-

cients, holding that the one matter was varied by diverse forms, posited two things on the part of the form, which is the principle of acting, and one on the part of matter, which is the principle of being acted upon. But the Platonists, considering how in one species many individuals are distinguished according to the division of matter, posited one thing on the part of the form which is the active principle, and two things on the part of matter which is the passive principle. Thus he concludes what was principally intended, namely that it seemed reasonable to those considering the foregoing and similar things that there are three principles of nature. He says this to indicate that he has proceeded from probable arguments.

14. Then when he says, "On the other hand, the view that they are more . . .", he shows that the principles are not more than three, by two arguments. The first is as follows: If a thing can come to be by fewer principles, it is superfluous if it come to be by more; but all generation of natural things can be taken care of by positing one material principle and two formal principles because, for anything to be acted upon, one material principle is sufficient. But if there were four contrary principles and two first contrarieties, each contrariety would have to have a different subject because one subject seems to belong primarily to one contrariety. Thus, if when we posit two contraries and one subject things can come to be from these, it seems to be superfluous to posit another contrariety. Therefore more than three principles should not be posited.

15. He gives the second argument where he says, "Moreover, it is impossible . . .", which is as follows: If there are more than three principles, there would have to be many first contrarieties. But this is impossible because the first contrariety seems to belong to the first genus which is one, namely substance. Whence all contraries which are in the genus of substance do not differ in genus but are related as prior and posterior because in one genus there is only one contrariety, namely the first, by the fact that all other contrarieties seem to be reduced to one first, because there are some first contrary differences by which the genus is divided. Thus, it seems that there are not more than three principles.

However, it must be considered that both these things are said probably, namely that there is not a contrariety in sub-

stances and that there is one first contrariety in substances, because, if we take that very thing which is the subject, there is nothing contrary to it; but, if we take the formal differences in the genus of substance, we will find contrariety in them.

16. Finally, in summing up, he concludes that neither is there only one principle, nor more than two or three. But which of these is true, namely whether the principles are two only, or three, is very doubtful, as is plain from what has gone before.

LESSON XII

THERE ARE THREE PRINCIPLES FOUND IN ANY NATURAL BECOMING: THE SUBJECT, TERM AND OPPOSITE

1. After the Philosopher has investigated the number of the principles disputatively, he here begins to determine the truth. This is divided into two parts: in the first he determines the truth; in the second, from the truth determined, he excludes the errors and doubts of the ancients where he says, "We will now proceed to show that . . ." The first is divided into two parts: in the first he shows that in any natural coming to be three things are found; in the second he shows from this that there are three principles where he says, "Plainly then, if there are conditions and principles . . ." About the first he does two things: first he states his intention; secondly he follows it out where he says, "We say that one thing comes to be from . . ."

2. Therefore, because he had said above that there is some difficulty whether there are only two principles of nature or three, he concludes that we must speak of this, considering first, generation and making in common for all species of change because in any change we find a certain becoming, just as what is altered from white to black becomes non-white from white and becomes black from non-black, and it is the same in the other changes. He gives the reason for this order of treatment by saying that we must first speak of the common things and afterwards see those things which are proper to each thing, as was said in the beginning of the book.

3. Then when he says, "We say that one thing comes to be

. . .", he treats the proposition. About this he does two things: first he sets forth certain things which are necessary in order to show the proposition; secondly he manifests the proposition where he says, "These distinctions drawn, one can . . ." About the first he does two things: first he gives a certain division; secondly he shows the differences between the parts of the division where he says, "As regards one of the simple things . . ."

4. He says first therefore that, since in any coming to be *one thing* is said to come from *another* insofar as it comes to be according to substantial existence or *one thing* comes to be from *another* insofar as it comes to be according to accidental existence because all change has two terms, we can state this in two ways, because we can take the terms of any making or change as simple or composite. This is explained as follows: Sometimes we say, *man becomes musical,* and then the two terms of making are simple, and likewise when we say that the *non-musical becomes musical.* But when we say, *the non-musical man becomes a musical man,* then each of the terms is composite. When coming to be is attributed to *man* or to *non-musical,* each is simple. Thus, that which becomes, i.e. that to which the coming to be is attributed, is signified, in the coming to be, as simple; but that in which the coming to be is terminated, which is signified in the coming to be as simple, is *musical*; as when I say *man becomes musical or non-musical becomes musical.* But each can be signified as composite (namely *that which comes to be,* i.e. that to which the becoming is attributed, and *that which it becomes,* i.e. that in which the becoming is terminated) because when we say, *non-musical man becomes musical,* there is composition on the part of the subject only, and simplicity on the part of the predicate, but when we say, *non-musical man becomes musical man,* there is composition on the part of both.

5. Then when he says, "As regards one of these simple . . .", he shows two differences between the preceding. The first is that in certain of the foregoing we use a twofold manner of speaking, namely that *this becomes this* and *this comes to be from this* because we say that *non-musical becomes musical* and *musical comes to be from non-musical.* But we do not speak this way in all things because we do not say *musical comes to be from man,* but rather *man becomes musical.*

He gives the second difference where he says, "When a simple

thing . . ." He says that when becoming is attributed to two simple things, namely to a subject and the opposite, one of these is permanent and the other is non-permanent because, when someone is already made musical, man remains, still, the opposite does not remain; whether this be the opposite negatively, as non-musical, or the opposite privatively or contrarily, as unmusical. Nor does that composed of the subject and the opposite remain because the non-musical man does not remain after man becomes musical. Nevertheless, becoming is attributed to these three because we said that *man becomes musical, non-musical becomes musical* and *non-musical man becomes musical.* Of these three, only the first remains in the completed making, the other two do not remain.

6. Then when he says, "These distinctions drawn, one can . . .", from the supposition of the preceding he shows the proposition, namely that in any natural making we find three things. About this he does three things: first he enumerates two things which are found in any natural making; secondly he proves what he had supposed where he says, "One part survives, the other does not: . . ."; thirdly he concludes what was proposed, where he says, "Thus, clearly, from what has been said, whatever . . ."

7. He says first therefore that from what was supposed, if anyone wishes to consider all things which come to be according to nature, he will accept first that there must always be some subject to which the becoming is attributed; and secondly that, although this is one in number or in subject, still, it is not the same in species and in definition because, when to become musical is attributed to man, man is one in subject but is two in definition, because the definition of man is not the same as that of non-musical. He does not give the third thing, namely that in generation it is necessary that something be generated, since that is evident.

8. Then he says, "One part survives, the other . . .", he proves the two things which he had presupposed: first, that the subject to which becoming is attributed is two in definition; secondly, that the subject must be supposed in all becoming where he says, "But there are different senses of . . ." He shows the first in two ways: first, by the fact that in the subject to which becoming is attributed there is something that remains and something that does not remain because that which is not opposed to the term

of the making remains; for example man remains when he becomes musical, but non-musical does not remain; nor does the composite, as non-musical man. From this it is evident that man and non-musical are not the same in definition, since one remains and the other does not.

9. Secondly where he says, "We speak of becoming that from . . .", he shows the same thing in another way because in non-permanent things we say *this comes to be from this,* rather than *this becomes this* (for, although the latter can be said, still, it is not the proper way of speaking) because we say that *musical comes to be from non-musical.* We also say that *non-musical becomes musical,* but this is accidental, insofar as that to which to be non-musical happens becomes musical.—But in permanent things we do not speak like that because we do not say that *musical comes to be from man,* but that *man becomes musical.* However, sometimes in permanent things we do say *this comes to be from this,* for example we say *the statue comes to be from bronze,* but this happens because by the name *bronze* we mean *unfigured,* and thus we say this by reason of the understood privation. And, although we say *this comes to be from this* in permanent things, still, both are rather said in non-permanent things, namely *this becomes this* and *this comes to be from this*; whether by non-permanent we mean the opposite, or whether we mean that composed of the opposite and the subject. Therefore, from the fact that we use a diverse way of speaking about the subject and the opposite, it becomes clear that the subject and the opposite, as man and non-musical, although the same in subject, are still two in definition.

10. Then when he says, "But there are different senses of . . .", he shows the other thing which he had supposed, namely that in all natural making there must be a subject. To prove this by argument pertains to the metaphysician, whence it is proved in the seventh book of the *Metaphysics,* but he proves it here only by induction: first, on the part of those things which come to be; secondly, on the part of the ways of coming to be where he says, "Generally things which come to . . ." He says first therefore that, since becoming is said in many ways, becoming *simpliciter* is only the becoming of substances; but other things are said to become *secundum quid.* This is true because becoming means the beginning of being; therefore, in order that something

come to be *simpliciter,* it is necessary that before it *simpliciter* was not, which happens in those things which come to be substantially because, in order that man come to be, it is necessary, not only that before he was not man, but that it is *simpliciter* true to say that he was not. But when man becomes white it is not true to say that before he was not, but only that before he was not such. Thus, in those things which come to be *secundum quid,* it is clear that a subject is required because quantity, quality and the other accidents, of which there is becoming *secundum quid,* cannot exist without a subject, because not to be in a subject belongs to substance alone. But even in substances, if we consider, it is clear that they come to be from a subject because we see that plants and animals come to be from a seed.

11. Then when he says, "Generally things which come to . . .", he shows the same by induction from the ways of coming to be. He says that, of those things which come to be, some come to be by transfiguration, as the statue comes to be from bronze; some come to be by apposition, as is plain in all things which are augmented, just as the stream comes to be from many rivulets; some come to be by abstraction, as the image of Hermes comes to be from stone by sculpture; some come to be by composition, as a house; some come to be by alteration, as those whose matter is altered, whether they come to be according to nature or according to art. In all these it is apparent that they come to be from some subject. Thus, it is evident that everything which comes to be, comes to be from a subject. But we must notice that artificial things are connumerated with those things which come to be *simpliciter* (although artificial forms are accidents) because artificial things are in the genus of substance in a certain way by their matter; or else because of the opinion of the ancients who thought of natural things in the same way as artificial things, as will be said in the second book.

12. Then when he says, "Thus, clearly, from what has . . .", he concludes the proposition. He says that it was shown from what was said that that to which becoming is attributed is always composite. And, since in any making there is that in which the becoming is terminated and that to which the becoming is attributed which is twofold, namely subject and opposite; it is clear that in any becoming there are three things, namely the subject, the term of making and its opposite. For example when

man becomes musical the opposite is non-musical, the subject is man, and musical is the term of making. Likewise, infiguration, unformedness, and inordination are opposites, but bronze, gold, and stones are subjects in artificial things.

LESSON XIII

THERE ARE TWO *PER SE* PRINCIPLES, MATTER AND FORM, IN THE EXISTENCE AND BECOMING OF NATURAL THINGS, AND ONE *PER ACCIDENS* PRINCIPLE, PRIVATION.

1. After the Philosopher shows that in any natural coming to be three things are found, here from the premisses he intends to show how many principles of nature there are. About this he does two things: first he shows the proposition; secondly, in a recapitulation, he shows what has been said and what remains to be said where he says, "Briefly, we explained first that only . . ." About the first he does two things: first he shows the three principles of nature; secondly he manifests them where he says, "The underlying nature is an object . . ." About the first he does three things: first he shows the truth about the principles of nature; secondly, from the truth shown, he resolves the preceding doubts about the principles where he says, "There is a sense, therefore, in which . . ."; thirdly, because the ancients always said that the principles are contrary, he shows whether contraries are always required or not where he says, "We have now stated the number of . . ." About the first he does two things: first he shows that there are two principles *per se* of nature; secondly he shows that there is a third principle *per accidens* of nature where he says, "Now the subject is one numerically . . ."

2. For the first he uses the following argument: Those things are said to be the principles and causes of natural things from which the latter are and come to be *per se* and not accidentally; but everything which comes to be, is and comes to be from a subject and a form; therefore the subject and the form are *per se* causes and principles of all that which comes to be according to nature. Moreover, he proves that that which comes to be accord-

ing to nature comes to be from a subject and a form, by the following: Those things into which the definition of some thing is resolved are those things which compose that thing because each thing is resolved into those things from which it is composed. But the definition of that which comes to be according to nature is resolved into a subject and a form because the definition of musical man is resolved into the definition of man and the definition of musical; because, if anyone wants to define musical man, he should give the definition of man and of musical. Therefore that which comes to be according to nature, is and comes to be from a subject and a form. It must be noted that he here intends to inquire about the principles not only of coming to be but also of existing. Thus he pointedly says, *from which they primarily are or come to be.* He says, *from which . . . primarily,* i.e. *per se* and not accidentally. Therefore the *per se* principles of everything which comes to be according to nature are the subject and the form.

3. Then when he says, "Now the subject is one numerically . . .", he adds the third principle *per accidens.* He says that, although the subject is numerically one, still, it is two in species and definition, as was said above, because man, gold, and every matter has a certain number because we must consider there the subject itself, which is something positively, from which something comes to be *per se* and not accidentally, as this thing which is man or gold, also we must consider there that which happens to it, namely the contrariety and privation, as unmusical and unfigured. Moreover, the third thing [in generation] is a species or form, just as ordination is the form of a house, musical is the form of the musical man, or any one of those things which are predicated in this way. Thus, therefore, the form and subject are *per se* principles of that which comes to be according to nature, but the privation or contrary is a *per accidens* principle insofar as it happens to the subject; just as we say that the builder is the active cause of the house *per se,* but musical is the active cause of the house *per accidens* insofar as to be musical happens to the builder. Thus man is the *per se* cause, as subject, of the musical man; but non-musical is the cause and principle of this *per accidens.*

4. But someone could object that privation does not happen to a subject when it is under a form; thus, privation is not a *per*

accidens principle of existing. Therefore it most be said that matter is never without privation because when it has one form it is with the privation of another form. Therefore, while something which comes to be (as musical man) is in the state of becoming, there is in the subject, when it does not yet have the form, the privation of the musical. Thus, the *per accidens* principle of musical man in the state of becoming is non-musical because this happens to man while he becomes musical. But when he already has this latter form he has along with it the privation of another form. Thus the privation of the opposite form is the *per accidens* principle of existing.—Therefore it is plain according to the intention of Aristotle that privation, which is given as a *per accidens* principle of nature, is not some aptitude for form nor an inchoation of form nor some imperfect active principle, as some say, but it is the very lack of form or the contrary of the form which happens to the subject.

5. Therefore when he says, "There is a sense, therefore, in which . . .", he solves all the preceding doubts according to the determined truth. He concludes from the preceding that in a certain sense we must say that the principles are two, namely *per se*; and in a certain sense, three, if we take also the principle *per accidens* along with the principles *per se*. And in a certain sense the principles are contrary, as when we take musical and non-musical, hot and cold, harmonious and inharmonious; and in a certain sense the principles are not contrary, namely if we take them without the subject, because contraries cannot be acted upon by each other unless we resolve this by the fact that for the contraries we suppose some subject by reason of which they are acted upon by each other. Thus he concludes that the principles are not more in number than the contraries, but there are only two *per se*. But neither are they totally two, because one of these is other according to being [*esse*], because the subject is two according to definition, as was said. Thus there are three principles because man and non-musical, bronze and unfigured differ according to definition. Thus it is plain that the former arguments to both parts were in some way true, but not totally.

6. Then when he says, "We have now stated the number of . . ." he shows in what way two contraries are necessary and in what way they are not. He says that it is clear from what was said how many principles there are in the generation of natural

things, and how there are that many. For it was shown that there must be two contraries, one of which is a principle *per se* and the other *per accidens;* and that there must be something subjected to the contraries which is also a principle *per se*. But, in some way, one of the contraries is not necessary for generation because one of the contraries suffices when its absence and presence causes a change.

7. To understand this it must be known that, as is said in the fifth book of this treatise, there are three species of, change namely generation, corruption and motion. The difference between these is this: motion is from one thing affirmed into another thing affirmed, as from white into black; but generation is from something negated into something affirmed as from non-white to white or from non-man into man; and corruption is from something affirmed into something negated, as from white into non-white or from man into non-man. Thus, therefore, it is plain that in motion we require two contraries and one subject. But in generation and corruption we require the presence of one contrary and its absence, which is privation.—But generation and corruption are saved in motion because by the fact that something is moved from white into black, white is corrupted and black comes to be. Thus, therefore, in every natural change there is required a subject, a form and a privation. But the nature of motion is not saved in every generation and corruption, as is plain in the generation and corruption of substances. Whence a subject, form and privation are saved in every change, but not a subject and two contraries.

8. Also this opposition is found in substances, which belong to the first genus, but not the opposition of contrariety because substantial forms are not contrary, although the differences in the genus of substance are contraries, according as one is taken with the privation of the other, as is plain with animated and inanimated.

9. Then when he says, "The underlying nature is an object . . . ", he manifests the preceding principles. He says that the nature which is primarily subjected to change, i.e. prime matter, cannot be known through itself, since everything that is known is known by its form, but prime matter is considered as the subject of every form. However, it is known *by an analogy*, i.e. according to a proportion, because we known that the wood is some-

thing besides the form of the bench or the couch, because it is sometimes under the one form and sometimes under the other. Therefore, when we see that what is air sometimes becomes water, we must say that something existing under the form of air is sometimes under the form of water. Thus that thing is something besides the form of water and something besides the form of air, just as wood is something besides the form of the bench and the form of the couch. Therefore, that which is thus related to the natural substances as the bronze is related to the statue and the wood to the couch and any material and unformed thing to form, we call prime matter. Therefore this is one principle of nature. However, it is not one as is a *this something*, i.e. as some signified individual such that it has a form and unity in act; rather it is called being and one insofar as it is in potency to form. Moreover, there is another principle which is the *ratio* [*reason, nature, definition*] or form. The third is privation which is contrary to the form. Also, in what way these principles are two and in what way they are three was said before.

10. Then when he says, "Briefly, we explained first that only . . .", he sums up what has been said and shows what remains to be said. Therefore he says that first we said that contraries are principles and afterwards that something is subject to these. Thus there are three principles. From those things which now have been said, it is clear what the difference is between the contraries because one is a principle *per se* and the other *per accidens*. Likewise, we stated in what way the principles were related to each other because the subject and a contrary are one in number and two in definition. Also, we told what the subject is, insofar as it could be shown. But we have not yet stated which is more substance, whether form or matter because this will be said in the beginning of the second book. But we did say that the principles are three and in what sense, and what their modes are. Finally he concludes what was principally intended, namely that it is clear how many the principals are and which they are.

LESSON XIV

FROM THE TRUTH DETERMINED ABOUT THE PRINCIPLES, THE DOUBTS AND ERRORS OF THE ANCIENTS WHICH AROSE FROM THEIR IGNORANCE OF MATTER ARE RESOLVED.

1. After the Philosopher has determined the truth about the principles of nature, he here excludes the doubts of the ancients by those things which were determined about the principles: first, the doubts or errors which came from the ignorance of matter; secondly, the doubts or errors which came from the ignorance of privation where he says, "Others, indeed, have . . ."; thirdly he reserves for another science the doubts which occur about the form where he says, "The accurate determination of . . ." About the first he does two things: first he gives the doubt and error into which the ancients fell from the ignorance of matter; secondly he resolves their doubt by those things which were determined where he says, "Our explanation on the other hand is . . ."

2. He says first therefore that after having determined the truth about the principles, we must state that only in this way is every *defect*, i.e. every doubt, of the ancients resolved. This is a sign that what was said about the principles is true because the truth excludes all falsity and doubt, but when the position is false in any way some difficulty necessarily remains.

Moreover, the doubt and error of the ancient philosophers was the following. The first ones who inquired into the truth and nature of things by philosophy were diverted into another path than that of truth and nature. This was because of the infirmity of their intellect because they said that nothing was generated or corrupted, which is against truth and against nature.—An infirmity of intellect forced them to posit these things because they did not know how to resolve this argument by which it seemed to be proved that being is not generated, because, if being comes to be, either it comes to be from being or from non-being. Both of these seem to be impossible, namely that being comes to be from being and that it comes to be from non-being. For it is evident that it is impossible that something came to be from being because that which is does not come to be. For, before it comes to

be, it is nothing; but being already is; therefore, it does not come to be. Also it is evident that it is impossible that something come to be from non-being because there must always be something subjected to that which comes to be, as was shown above, and nothing comes to be from nothing. From this they concluded that there was neither generation nor corruption of being.

And those arguing in this way went further and augmented their position by saying that there were not many beings but only one being. They said this because of the preceding argument. For, since they said that the material principle is one, and that, from this, nothing could be caused according to generation and corruption, but only according to alteration; it followed that that thing would always remain one according to substance.

3. Then when he says, "Our explanation on the other hand . . .", he resolves the preceding objection. About this he does two things: first he resolves the preceding objection in two ways; secondly he concludes the principal proposition where he says, "So as we said, the difficulties . . ." The first is divided into two parts according to the two solutions which he gives; the second begins where he says, "Another consists in pointing . . ."

4. He says first therefore that, as to the manner of speaking, there is no difference in saying that something comes to be from being or from non-being or that being or non-being makes or suffers something, whether from any other thing whatsoever, and saying such propositions about a doctor, namely that the doctor makes or suffers something or that something is or comes to be from a doctor. But to say that the doctor makes or suffers something, or that something comes to be from the doctor, can be understood in two ways. Therefore to say that something comes to be from being or from non-being, or that being or non-being makes or suffers something, can be understood in two ways. And it is similar in whatever other terms it is posited, for example if we say that something comes to be from white or that white makes or suffers something.—That there is a twofold meaning when we say that the doctor makes or suffers something, or that something comes to be from the doctor, is evident from the following: We say that the doctor builds; but he does not do this insofar as he is a doctor, but insofar as he is a builder. Similarly we say that the doctor becomes white, not insofar as he is a doctor, but insofar as he is black. In another way we say that the

doctor heals insofar as he is a doctor; and that the doctor becomes non-doctor insofar as he is a doctor. But then we say properly and *per se* that the doctor makes or suffers something, or that something comes to be from the doctor, when this is attributed to the doctor insofar as he is a doctor; but it is *per accidens* when it is attributed to him, not insofar as he is a doctor, but insofar as he is something else. Thus, therefore, it is plain that when we say that the doctor makes or suffers something, or that something comes to be from the doctor, this is to be understood in two ways, namely *per se* and *per accidens*. Whence it is clear that when it is said that something comes to be from non-being, this is understood properly and *per se*, if something comes to be from non-being insofar as it is non-being; and the argument is similar for being.

And, not perceiving this distinction, the ancients sinned insofar as they thought nothing comes to be; nor did they think that anything outside of that which they posited as the first material principle had substantial existence. For example those who said that air is the first material principle, said that all other things signify a certain accidental existence. Thus they excluded all substantial generation, leaving only alteration. Because something does not come to be *per se* from non-being or from being, they thought that nothing could come to be from being or from non-being.

5. But we ourselves say that nothing comes to be from non-being *simpliciter* and *per se*, but only accidentally because what is, i.e. being, is not *per se* from privation. This is true because privation does not enter into the essence of the thing made. But something comes to be *per se* from something else because the latter is in the thing after the thing is already made. However, the figured thing does not come to be *per se*, but *per accidens*, from unfigured because after it is already figured, unfigured is not in it. But this is a wonderful way of coming to be something from non-being, and one which seemed impossible to the ancient philosophers. Thus, therefore, it is plain that something does not come to be from non-being *per se*, but *per accidens*.

6. Similarly, if we ask whether something comes to be from being, we must say that something comes to be from being, not *per se*, but *per accidens*. He shows this by the following example. We might say that a dog was generated from a horse. Supposing this, it is clear that a certain animal comes to be from a certain

animal; and thus, animal will come to be from animal. But, still, animal will not come to be from animal *per se* but *per accidens* because it does not come to be insofar as it is animal, but insofar as it is this animal, because it is already animal before it becomes dog, because it is horse, but it is not *this* animal which is dog. Whence this animal which is dog comes to be *per se* from non-this-animal, i.e. from non-dog. Thus, if animal were to come to be *per se* and not *per accidens*, it would necessarily come to be from non-animal. It is the same also with being because being comes to be something from this non-being, but it happens to this that it is not that which comes to be being. Whence something does not come to be *per se* from being, nor *per se* from non-being because this latter *per se* would signify that something comes to be from non-being, if it were to come to be from non-being insofar as it is non-being, as was said. And just as when this animal comes to be from that animal, or this body from that body, we do not remove every body or every non-body, nor every animal or non-animal, from that from which something comes to be; so, also, we do not remove every existence or every non-existence from that from which this being comes to be because that from which this being which is fire comes to be has some existence, because it is air, and it has some non-existence, because it is not fire.

7. This, therefore, is one way of resolving the preceding doubt. But this way of resolving it is insufficient because, if being comes to be *per accidens* from both being and non-being, we must posit something from which being comes to be *per se* because everything which is *per accidens* is reduced to that which is *per se*.

8. Thus, in order to show that from which something comes to be *per se* he adds a second way where he says, "Another consists in pointing out . . ." He says that the same things can be said both according to potency and according to act, as is determined more certainly in other places, namely in the ninth book of the *Metaphysics*. Thus, something comes to be *per se* from being in potency; but something comes to be *per accidens* from being in act or from non-being. Moreover, he says this because matter, which is being in potency, is that from which something comes to be *per se* because this is what enters into the substance of the thing made. But something comes to be *per ac-*

cidens from privation, or from the preceding form, insofar as it happens that the matter from which something comes to be *per se* is under such form or under such privation; as the statue comes to be *per se* from bronze, but it comes to be *per accidens* from that which does not have such a figure or from that which has some other figure.

9. Finally, he concludes the principal proposition where he says, "So as we said, the . . .": saying that as we said, all difficulties, i.e. doubts, are resolved by the preceding. Some of the ancients, moved by such doubts, abandoned some of the preceding notions, namely the generation and corruption and plurality of substantially different things. But, having shown this nature, namely matter, he resolves all their ignorance.

LESSON XV

MATTER IS DISTINGUISHED FROM PRIVATION, AND THE FORMER IS SHOWN TO BE INCAPABLE OF GENERATION AND CORRUPTION.

1. After the Philosopher has excluded the doubts and errors of the ancient philosophers which arose from their ignorance of matter, he here excludes the errors coming from their ignorance of privation. About this he does three things: first he proposes the errors; secondly he shows the difference between this position and the truth which he determined above where he says, ". . . which is a very different thing . . ."; thirdly he proves that his opinion is true where he says, "For, the one which persists . . ."

2. He says first therefore that certain philosophers touched upon matter, but not sufficiently, because they did not distinguish between privation and matter. Whence they attributed what belongs to privation, to matter. And, because privation, in itself, is non-being, they said that matter, in itself, is non-being. Thus, just as something *simpliciter* and *per se* comes to be from matter, they thought that something *simpliciter* and *per se* comes to be from non-being. They were led to posit this for two reasons. First by the argument of Parmenides who said that what-

ever is besides being is non-being. Whence, since matter is outside being because it is not actual being, they said that it is *simpliciter* non-being; secondly, because it seemed to them that what is one in number or subject is also one in definition. He here calls this latter one *in potency* because those things which are one in definition are so related that each has the same power [*virtus*], but those things which are one in subject but not in definition do not have the same potency or power, as is plain in white and musical. Moreover, the subject and privation are one in number, as bronze and unfigured. Thus it seemed to them that they would be the same in definition or power. Therefore it is thus that he here takes unity of potency.

3. But, lest someone here doubt, because of these words, the nature of the potency of matter and whether it is one or many; it must be said that act and potency divide any genus of beings, as is plain in the ninth book of the *Metaphysics* and the third book of this treatise. Whence, just as the potency to quality is not outside the genus of quality, so the potency to substantial existence is not something outside the genus of substance. Therefore the potency of matter is not some property added to its essence, rather matter is substantially a potency to substantial existence. Still, the potency of matter is one in subject with respect to many forms, but in definition there are many potencies according to the relationship to diverse forms. Whence it will be said in the third book that the capacity of being healed and the capacity of becoming ill differ according to definition.

4. Then when he says, "Which is a very different thing . . .", he shows the difference between his opinion and the preceding. About this he does two things: first he states his own opinion; secondly he shows what the other opinion posits where he says, "They, on the other hand identify . . ." He says first therefore that there is a great deal of difference between being one in number or subject and being one in potency or definition because we ourselves say, as is plain from the above, that matter and privation, although they are one in subject, still, they are other in definition. Which is plain from two things: first, because matter is non-being accidentally, but privation is non-being *per se*, because unfigured signifies non-being, but bronze does not signify non-being except insofar as unfigured happens to it; secondly, because matter is *nearly* a thing and *is* in some way be-

cause it is in potency to a thing and is, in a way, the substance of the thing, because it enters into the constitution of the substance. But this cannot be said of privation.

5. Then when he says, "They, on the other hand, identify . . .", he shows the Platonic opinion. He says that the Platonists posited two things on the part of matter, namely the great and the small, but in a different way than Aristotle did. because Aristotle posited these two as matter and privation, which are one in subject and differ in definition, but the Platonists did not posit that one of these was privation and the other matter, rather they assumed that both were privation, namely the small and the great; whether they took these two together, as when they spoke without distinguishing it [privation] by the great and small, or whether they took each singly. Whence it is plain that the Platonists, positing the form and the great and the small, posited three principles in an entirely different way than did Aristotle who posited matter, privation and form. But the Platonists arrived at a point beyond the other ancient philosophers, namely that one certain nature which is prime matter must be supposed for all natural forms. But they made this one, not only in subject, but also in definition, not distinguishing between it and privation, because, although they posit duality on the part of matter, namely the great and the small, still they did not make a distinction between matter and privation, rather they mention only matter, under which the great and the small are included. They overlooked privation, not mentioning it.

6. Then when he says, "For, the one which persists is . . .", he proves that his own opinion is true. About this he does two things: first he shows the proposition, namely that privation must be distinguished from matter; secondly he shows in what way matter is corrupted or generated· where he says, "The matter comes to be and . . ." Moreover, he shows the first in two ways: first, ostensively; secondly, by reduction to the impossible where he says, ". . . the other such as of its own nature . . ."

7. He says first therefore that this nature which is subjected, namely matter, is, together with the form, the cause of those things which come to be according to nature, after the fashion of a mother because just as the mother is the cause of generation as receiving, so also is matter. But if anyone were to take the other part of the contrariety, namely privation, in extending the

meaning of it he will imagine that it does not pertain to the constitution of the thing, but rather to a certain evil of the thing, because it is entirely non-being, since privation is nothing other than the negation of a form in a subject and is outside the whole of being. In privation, as such, the argument of Parmenides, namely that whatever is besides being is non-being, holds; but it does not hold in matter, as the Platonists say. He shows that privation pertains to evil by the fact that the form is something divine, optimum and appetible. It is divine because every form is a certain participation of the similtude to divine existence, which is pure act because each thing is in act insofar as it has form. It is optimum because act is the perfection of the potency and its good. Consequently, it follows that it is appetible because each thing desires its own perfection. But privation is opposed to form, since it is nothing other than its removal. Whence, since that which is opposed to the good and removes it is evil, it is evident that privation pertains to evil. Thus it follows that it is not the same as matter which is the cause of the thing as is the mother.

8. Then when he says, ". . . the other such as of its own nature . . .", he shows the same by an argument leading to the impossible in this way. Since the form is something good and appetible, matter which is other than form and privation is innately apt to desire [*appetere*] and wish for [*desiderare*] is [form] by its own nature. But for those who did not distinguish between matter and privation there is a difficulty, namely that the contrary desires the corruption of its own self, which is illogical. He shows that this is so because, if matter desires form, it does not desire it according as it is under that very form, because it then does not need existence by that form (but every appetite is because of a need, because the appetite is about something which is not possssed). Likewise, matter does not desire the form according as it [matter] is under a contrary form or privation because one of the contraries is corruptive of the other; thus, something would desire its own corruption. Thus it is evident that matter, which desires form, is other in definition from privation, as well as from form because, if matter desires form according to its proper nature, as was said, and if we say that matter and privation are the same in definition, it follows that privation desires form, and thus it desires its own corruption; which is im-

possible. Whence, also, it is impossible that matter and privation are the same in definition. But still, matter is also *this, i.e.* that which has privation. For example woman desires man and the vile, the good, but not in such a way that vileness itself desires the good contrary to itself, but accidentally, because that to which to be vile happens desires to be good. Likewise, feminity does not desire masculinity, but only that to which to be feminine happens desires it. Likewise, privation does not desire to be the form, but that to which the privation happens, namely matter, desires it.

9. But Avicenna objects to these words of the Philosopher in three ways: first, because matter does not fittingly have an animal appetite, as is evident *per se*, nor does it have a natural appetite so that it might desire a form, since it does not have some form or virtue inclining it to something because the heavy naturally desires the lowest place insofar as, by its own gravity, it is inclined to such a place. Secondly he objects, because if matter desires form, this is because it lacks all form or because it desires to have many forms at the same time, which is impossible, or because it dislikes the form which it has and seeks to have another, and this is also vain. Therefore, it seems that in no way can it be said that matter desires form. Thirdly he objects, because saying that matter desires form as woman a man is to speak figuratively, as poets, and not as philosophers.

10. But it is easy to resolve these objections. It must be known that everything that desires something either knows this and orders itself to it, or it tends towards it from an ordination and direction of something that knows, as the arrow tends to a determined target by the direction and ordination of the archer. Thus the natural appetite is nothing other than the ordination of things towards their ends according to their proper nature. Moreover, it is not only true that things in act are ordered to their ends by an active power, but also matter, according as it is in potency, because form is the end of matter. Thus, to say that matter desires form is nothing else than to say that it is ordered to form as potency to act.—And, because regardless what form it may be under it still remains in potency to another form, it always has an appetite for form, not because of a dislike for the form which it has, nor because it seeks to have contraries together; but because it is in potency to other forms while it has

one in act.—Nor does he use here a figure of speech, but rather an example because it was said above that prime matter is knowable according to proportion insofar as it is related to substantial forms as sensible matter is related to accidental forms. Therefore, in order to manifest prime matter, we must use the example of sensible substances. Thus, just as he used the example of unfigured bronze and non-musical man to show matter, he now uses the example of woman desiring man and the vile desiring good in order to show this because this happens to these insofar as they have something of the nature of matter. Still, it must be known that Aristotle here speaks against Plato who used such metaphorical ways of speaking, assimilating matter to the mother and woman and form to man. Therefore Aristotle uses the metaphors which he assumed against him.

11. Then when he says, "The matter comes to be and . . .", he shows how matter is corrupted. He says that in a way it is corrupted and in a way it is not. For, according as there is privation in it, it is corrupted when it ceases to have privation in it, as if we were to say that the unfigured bronze is corrupted when it lacks the being unfigured. But, in itself, insofar as it is a certain being in potency, it is ungenerated and incorruptible. Which is plain as follows: If matter were to come to be, there must be some subject from which it would come to be, as is plain from the above. But the first thing which is subjected in generation is matter because we call that matter which is the first subject from which something comes to be *per se* and not accidentally, and which is the first subject from which something comes to be *per se* and not accidentally, and which is in the thing then made (and each of these is posited to show the difference between matter and privation from which something comes to be *per accidens*, and which is not in the thing made). Thus it follows that matter would be before it came to be, which is impossible. Likewise, everything that is corrupted is resolved into prime matter. Therefore, when it already is prime matter, it is corrupted. Thus, if prime matter were corrupted, it will be corrupted before it is corrupted, which is impossible. Thus it is impossible that prime matter be generated or corrupted. But this does not exclude the idea that it might proceed into being by creation.

12. Then when he says, "The accurate determination . . .", because he has already excluded the errors about privation and

matter, it seems that it remains to exclude the errors and doubts about form because some posited separated forms, namely ideas, which led to one first idea. Thus he says that, about the formal principle, whether it is one or many and how many and what they might be, the determination belongs to first philosophy and will be reserved until that time because form is the principle of existing; and being, as such, is the subject of first philosophy; but matter and privation are principles of transmutable being which is considered by the philosopher of nature. However, some aspects of natural and corruptible forms will be determined in the following books of this doctrine.—Finally, he sums up what was said. He says that thus it has been determined that there are principles, what they are, and how many. But we must make another beginning in natural science by inquiring about the principles of the science.

BOOK II

LESSON I

WHAT IS NATURE? WHICH THINGS HAVE NATURE AND WHICH THINGS ARE ACCORDING TO NATURE?

1. After the Philosopher has determined in the first book the principles of natural things, he here determines the principles of natural science. Now in any science the things that must first be known are its subject and the medium by which it demonstrates. Thus the second book is divided into two parts: in the first he determines what things natural science considers; in the second, by what causes it demonstrates where he says, "Now that we have established these . . ." The first of these is divided into two parts: in the first he shows what nature is; in the second, which things natural science considers where he says, "We have distinguished, then, the different . . ." The first of these is divided into two parts: in the first he shows what nature is; in the second how many ways it is used where he says, "Some identify the nature or substance . . ." The first of these is divided into two parts: in the first he shows what nature is; in the second he excludes the notion of certain ones who attempted to demonstrate that nature exists where he says, "That nature exists . . ."

For the first he does two things: first he shows what nature is; secondly, those things which are denominated by nature where he says, "Things 'have a nature' which . . ." About the first of these he does three things: first he investigates the definition of nature; secondly he concludes the definition where he says, "— which seems to indicate that . . ."; thirdly he explains the definition where he says, "I say 'not in virtue of a . . ."

2. He says first therefore that among all beings we say that some exist by nature while some exist by other causes, for example by art or by chance. We say that any animal exists by nature, also its parts as flesh and bones, and even plants and simple bodies, namely the elements which are not resolved into some prior body, for example earth, fire, air and water because these and all similar things are said to be by nature. All these differ from those which are not by nature because they seem to have in themselves a principle of a motion or rest: some, a mo-

cion according to place, as the heavy and light bodies, and even the celestial bodies are like this; others, a motion according to augmentation and decrease, for example animals and plants; and still others, a motion according to alteration, for example the simple bodies and all those which are composed of these. But those things which are not by nature, as a bed, clothing and the like which receive such predication because they exist by art, have no principle of change in themselves except accidentally, namely insofar as the matter and substance of artifactitious bodies are natural things. Therefore, insofar as to be iron or stone happens to artificial things, they have in themselves a principle of motion, but not insofar as they are artifactitious because a knife has in itself a principle of downward motion, not insofar as it is knife, but insofar as it is iron.

3. But it does not seem to be true that in every change of natural things there is a principle of motion in that which is moved because in alteration and generation of simple bodies the whole principle of motion seems to be by an extrinsic agent. For example, when water is heated or air is changed into fire, the principle of change is by an exterior agent.

Therefore some say that even in such changes the active principle of motion is in that which is moved; not indeed as perfect, but as imperfect, because it helps the action of the exterior agent, because they say that there is in matter an inchoation of form which they say is privation which is a third principle of nature; and, because of this intrinsic principle, the generations and alterations of simple bodies are called natural.

But this could not be true because, since nothing acts except insofar as it is in act, the aforesaid inchoation of form, since it is not act but an aptitude for act, cannot be the active principle. Besides, even if it were the completed form it would not act upon its own subject by altering it because it is not the form which acts, but the composite which cannot alter itself unless there are two parts in it, one of which is doing the altering and the other which is altered.

4. Therefore we must say that there is a principle of motion in natural things according to the way in which motion belongs to them. In those to which [the act of] moving belongs there is an active principle of motion; but in those to which being moved belongs there is a passive principle which is matter. This latter

principle, insofar as it has a natural potency for such a form and motion, causes the motion to be natural. Because of this, the productions of artificial things are not natural because, although there is a material principle in that which comes to be, it does not have a natural potency for such a form. Thus even the local motion of the celestial bodies is natural, although it comes from a separated mover insofar as there is in the celestial body itself a natural potency for such motion. But in heavy and light bodies there is a formal principle of their own motion (but this formal principle cannot be called the active potency to which this motion pertains, rather it is contained under the passive potency because gravity in earth is not a principle such that it moves but rather that it might be moved) because just as the other accidents follow the substantial form, so also does place, and consequently to be moved to a place. But this does not mean that the natural form is the mover, rather the mover is the one generating which gives such form for which such motion follows.

5. Then when he says, "—which seems to indicate that . . .", he concludes the definition of nature from the preceding in this way: Natural things differ from non-natural things insofar as they have a nature; but they do not differ from non-natural things except insofar as they have a principle of motion in themselves; therefore nature is nothing other than *the principle of motion and rest in that in which it is primarily and per se and not accidentally.*

Principle is posited in the definition of nature as a genus and not as something absolute because the name *nature* implies the condition of principle. It is because those things are said to be born [*nasci*] which are generated while being joined to that which is generating, as is plain in plants and animals, that the principle of generation or motion is called *nature.* Thus it was ridiculous for some to wish to correct the definition of Aristotle by trying to define nature by something absolute, saying that nature is *a force implanted in things,* or something similar. Moreover, nature is called a *principle and cause* in order to show that, in that which is moved, nature is not a principle of all motions in the same way but in various ways, as was said.

He says *of moving and resting* because those things which are naturally moved towards a place similarly, or even more naturally, rest in the place. For this reason fire is naturally moved

upwards because it exists there naturally, and it is for this reason also that each thing is naturally moved. However, this does not mean that, in anything that is moved naturally, nature is also the principle of resting because the celestial body is moved naturally, but it does not rest naturally; rather this is said only to the extent that there is not only a principle of motion but also a principle of rest.

He says *in which it is* in order to differentiate it from the principle of artificial things in which motion is found only accidentally. He adds *primarily* because, although nature is the principle of the motion of composite things, it is not the principle primarily. Thus the fact that the animal is moved downwards is not caused by the nature of the animal as animal but by the nature of the dominating element.

The reason for saying *per se and not accidentally* is explained when he says, *I say 'not in virtue of a concomitant attribute'*. Sometimes it happens that a doctor is the cause of his own health; thus the principle of his own health is in him, but accidentally; therefore the principle of health in him is not nature because he does not have the medicinal operation insofar as he is healed but insofar as he is a doctor. Moreover, it is an accident that the same individual is a doctor and is healed because he is healed insofar as he is ill. Therefore, because they are accidentally joined, they are sometimes accidentally divided because it happens that the doctor healing is not the sick person who is healed. But the principle of natural motion is in the natural body which is moved, insofar as it is moved, because insofar as fire has lightness it is carried upwards. Nor are these divided from each other in such a way that the body which is moved upwards is one thing and the light something else, rather they are always one and the same. As it is with the doctor healing so with all artificial things because none of these has in itself the principle of its own production; rather some of these come to be from something extrinsic, as a house and other things which are made by hand while others come to be from an intrinsic principle, but accidentally, as was said. Thus we have said what nature is.

6. Then when he says, "Things 'have a nature' which . . .", he defines those things which are denominated by *nature*. He says that *things having a nature* are those which have in themselves a principle of their own motion. And all such subjects are

natures because nature is subject insofar as matter is called nature; it is also in a subject insofar as form is called nature.

7. Then when he says, "The term 'according to nature' . . .", he explains what is *according to nature* and he says that both the subjects whose existence is by nature and even the accidents which are caused in these by such a principle are said to be according to nature; for example *to be carried upwards* is not the nature itself, nor is it that having nature, but it is caused by nature. Thus we have said what nature is, what that which has nature is, and what is according to nature.

8. Then when he says, "That nature exists . . .", he excludes the presumption of some who wished to demonstrate that nature exists. He says that it is ridiculous to try to demonstrate that nature exists, since it is evident to sense that many things exist by nature which have in themselves the principle of their own motion. Moreover, the man who wishes to demonstrate the evident by means of the inevident is one who cannot judge what is known by reason of itself and what is not known by reason of itself, because, when he wants to demonstrate that which is known by reason of itself, he uses it as if it were not known by reason of itself. It is clear that this happens in some cases because sometimes one who is born blind syllogizes about colors. For such a one, that which is used as a principle is not known *per se* because he does not have an understanding of the thing, rather he uses names only, because our knowledge arises from sense and he who lacks one of the senses lacks a science. Thus those born blind who have never sensed color cannot understand anything about colors; thus they use what is not known as if it were known. The contrary happens to those who wish to demonstrate that nature exists because they use what is known as unknown. That nature exists is known *per se* insofar as natural things are evident to sense. But what the nature of each thing is or what the principle of motion is is not evident.—Thus it is plain from this that Avicenna, desiring that the existence of nature be capable of demonstration, but not by the naturalist because no science proves its own principles, irrationably attempted to disprove the statement of Aristotle.—But ignorance of the [proper] moving principles does not prevent the existence of nature from being known *per se*, as was said.

LESSON II

BOTH MATTER AND FORM ARE NATURE, BUT MORE SO THE FORM.

1. After the Philosopher shows what nature is, he here shows in how many ways nature is said. First he shows that nature is said of matter; secondly, that it is said of form where he says, "Another account is that 'nature' is . . ." With regard to the first point it should be noted that the ancient philosophers of nature, not profound enough to arrive at prime matter, as was said above, said some sensible body was the prime matter of all things, for example fire, air or water. Thus it followed that all forms came to matter as to something in the act of existing, as happens in artificial things because the form of the knife comes to iron which is already in the act of existing. Thus they had a similar opinion of the forms of natural things as about the forms of artificial things. Therefore he says first that for some it seemed that the substance and nature of natural things is that which is primarily in each thing and which, considered in itself, is unformed; as if we were to say that the nature of a bed is wood and the nature of a statue is bronze because wood is in the bed and, considered in itself, it is not formed. Antiphon said that a sign of this is that if one were to plant a bed in the earth and when the wood decays they were to take the potency as something growing from these, that which is generated will not be a bed, but wood. Also, because substance is that which remains and it belongs to nature to generate a thing similar to itself, he concluded that every disposition which is according to whatever law of reason or according to art is an accident; that which remains is the substance which continually undergoes such a change of dispositions. Therefore, having supposed that the forms of artificial things are accidents and that the matter is substance, he assumed another proposition, namely that just as the bed and statue are to wood and bronze so also any of the latter are to something else which is their matter; for example bronze and gold are so related to water (because the matter of all liquefiables seems to be water) and bones and wood, to earth; and it is similar for any of the other natural things. Thus he concluded that those material things subsisting in natural forms

were their nature and substance. Because of this some thinkers, namely the first theologizing poets, said that earth is the nature and substance of all things; but the later philosophers posited fire, air, water, a combination of these or all combined, as is plain from what was said above, because they said there were as many substances of all things as there were material principles and that all other things were accidents of these, i.e. of the material principles, either as a passion, habitus, disposition or of anything else which would be reduced to the genus of accident. Thus one difference which they posited between material and formal principles is that they differed as substance and accident. Another difference was that they said that these differed as perpetual and corruptible, because they said that each of the aforesaid simple bodies is a material principle and that this is incorruptible because they did not say that they were changed into each other, but all other things, they said, came to be and were corrupted infinitely many times. For example, if water were the material principle, they said that water would never be corrupted but would remain in all things as their substance, but bronze, gold and other things like these would be generated and corrupted infinitely many times.

2. Moreover, this position is in some respects true and in some respects false. Insofar as matter is the substance and nature of natural things it is true because matter enters into the constitution of the substance of any natural thing, but insofar as they said that all forms are accidents it is false. Therefore from this opinion and its reason he concludes a truth, namely that we apply the term nature to the matter which is subject in each natural thing having in itself the principle of motion or of any other change because motion is a species of change, as will be said in the fifth book of this work.

3. Then when he says, "Another account is that 'nature' is . . . ", he shows that nature is said of form. About this he does two things: first he shows the proposition, namely that the form is nature; secondly he shows the diversity of forms where he says, " 'Shape' and 'nature', it should be added, are . . ." He shows the first by three arguments. He says first therefore that in another way nature is said of the form and the species which is as the definition [*ratio*], i.e. that from which the definition of the thing is constituted. He proves this by the following argument.

Just as art is that which belongs to something insofar as it is according to art and artificial, so nature is that which belongs to something insofar as it is according to nature and natural. But we do not say that that which is only in potency to being artificial has something of art because it does not yet have the species of bed. Therefore in natural things that which is in potency to flesh and bone does not have the nature of flesh and bone before it receives the form according to which the definitive reason of the thing is taken (namely that by which we know what flesh or bone is), nor is the nature in it before it has the form. Therefore the form also, which although it is not separated from matter in the thing still differs from it by definition, is in another way the nature of natural things having in themselves a principle of motion. Just as bronze and unfigured, although they are one in subject, nevertheless differ by definition; so also do matter and form. He says this because, if form were not different than matter in definition, the way in which matter is called nature would not be different from the way in which form is called nature.

4. Because matter is called nature and form also, one could believe that the composite could be called nature because substance is said of form, matter and of the composite. But he excludes this, saying that what is composed of matter and form, as man, is not itself nature but is something *by nature* because nature implies the notion of principle while the composite implies the notion of being from principles.

5. From the preceding argument he further proceeds to show that form is nature to a greater degree than is matter because each thing is said to a greater degree insofar as it is in act rather than insofar as it is in potency. Thus the form, insofar as it is something natural in act, is nature to a greater degree than matter, insofar as the latter is something natural in potency.

6. He gives the second argument where he says, "Again man is born from man . . ." He says that although bed is not made from bed, as Antiphon said, still man is made from man. Thus what they say is true, namely that the form of the bed is not nature, rather [the nature is] wood because if the wood were to sprout it would not be a bed which was produced but wood. Therefore just as this form which is not produced by germination is not nature but art, so also the form which is produced by

generation is nature. But the form of a natural thing is produced by generation because man is made from man. Therefore the form of a natural thing is nature.

7. He gives the third argument where he says, "We also speak of a thing's nature . . .", which is as follows: Nature can be signified as generation, for example when nature is spoken of as nativity. Nature so called as generation, i.e. as nativity, is a way into nature because actions are different from passions by the fact that actions are denominated by principles, but passions by terms. This is because each thing is denominated by act and act is the principle of action and the term of passion because it is not the same in passions as in actions. Medication is not called a way into medicine, but into health, because medication is necessarily from medicine, not into medicine. But nature *spoken of as generation,* i.e. nativity, is not related to nature as medication is to medicine, rather it is related to nature as to a term, since it is a passion, because that which is born [*nascitur*], insofar as it is born, comes from something into something. Thus that which is born is denominated by that into which and not by that from which it comes. Moreover, that into which nativity tends is the form. Therefore form is nature.

8. Then when he says, " 'Shape' and 'nature', it should be . . .", he shows that nature which is form is said in two ways, namely of the incomplete and the complete form. This is plain in generation *secundum quid,* for example when something becomes white, because whiteness is the complete form and the privation of whiteness is in a way the species insofar as it is joined to blackness which is the imperfect form. But whether in simple generation, which belongs to substances, there is something which is privation and at the same time contrary, so that substantial forms would be contrary or not, must be considered later in the fifth book of this work and in the book *On Generation.*

LESSON III

THE WAY IN WHICH THE PHYSICIST AND THE MATHEMATICIAN DIFFER WHEN CONSIDERING THE SAME THING.

1. After the philosopher shows what nature is and in how many ways it is said, he here intends to show what things natural science considers. This is divided into two parts: in the first he shows how the philosopher of nature differs from the mathematician; in the second he shows to what things the consideration of natural science extends where he says, "Since 'nature' has two senses . . ." About the first of these he does three things: first he raises the question; secondly he gives arguments for the question where he says, "Obviously physical bodies contain . . ."; thirdly he resolves the question where he says, "Now the mathematician . . ." He says first therefore that after we have determined in how many ways nature is said we must consider how the mathematician differs from the philosopher of nature.

2. Then when he says, "Obviously physical bodies contain . . .", he gives arguments for the question. The first of these is as follows: Whatever sciences consider the same subjects are either the same or one is part of the other; but the mathematical philosopher considers points, lines, surfaces and bodies and the philosopher of nature does likewise (he proves this by the fact that natural bodies have *planes,* i.e. surfaces, *volumes,* i.e. solids, lengths and points; moreover, the philosopher of nature must consider all things which are found in natural bodies); therefore it seems that natural science and mathematics are either the same or one is part of the other.

He gives the second argument where he says, "Further, is astronomy different . . ." With respect to this argument he first raises the question whether astronomy is entirely different from the philosophy of nature or whether it is a part of it. It is evident that astronomy is part of mathematics. Thus, if it is also part of the philosophy of nature, it follows that mathematics and physics are the same at least in this part. He proves in two ways that astronomy is part of physics. First by the following argument: Any science which knows the substances and natures of any things considers also their accidents; but the philosopher of nature con-

siders the nature and substance of the sun and moon, since these are natural bodies; therefore the philosopher of nature should consider the *per se* accidents of these. This he proves from the practice of philosophers because the philosophers of nature are seen to determine the shape of the sun, moon, earth and of the whole world about which the astronomers also labor. Therefore astronomy and natural science agree not only in the same subjects but also in the consideration of the same accidents and in the demonstration of their conclusions. Thus it seems that astronomy is part of physics and consequently physics is not totally different from mathematics.

3. Then when he says, "Now the mathematician . . .", he resolves the question. About this he does two things: first he gives the solution; secondly he confirms it where he says, "This becomes plain if one tries . . ." About the first he does three things: first he resolves the question; secondly he draws a corollary from the preceding where he says, "That is why he separates . . ."; thirdly he excludes an error where he says, "The holders of the theory of Forms . . ."

4. He says first therefore that the mathematician and the philosopher of nature treat the same things, namely points, lines, surfaces and the like, but not in the same way because the mathematical philosopher does not treat these insofar as each is the term of a natural body; nor does he consider those things which happen to these insofar as they are terms of a natural body. However, this is the way that natural science considers these things. Moreover, it is not illogical that the same thing be considered in diverse sciences according to diverse considerations.

5. Then when he says, "That is why he separates . . .", he draws a corollary from the preceding. Because the mathematical philosopher considers lines, points, surfaces and the like and their accidents, but not insofar as they are terms of a natural body, he is said to abstract from sensible and natural matter. The reason that he can abstract is that these are abstracted from motion according to understanding.

To see this we must consider that many things are joined in one thing in such a way that one of these does not depend upon another in order to be understood; for example white and musical are joined in some subject, but one is not necessary for un-

derstanding the other and therefore one can be understood separately without the other. This is to abstract our understanding of one thing from that of another. Moreover, it is clear that posterior things are not necessary for understanding prior things, but rather the opposite. Therefore prior things can be understood without the posterior, but the opposite is not true. For example, it is plain that *animal* is prior to *man* and *man* is prior to *this man* (because *man* results from something added to *animal* and *this man* from something added to *man*); for this reason *man* is not necessary for understanding *animal* nor is *Socrates* necessary for understanding *man*. Therefore *animal* can be understood without *man* and *man* without *Socrates* and the other individuals. This is the abstraction of the universal from the particular.

Similarly, among all the accidents which come to the substance, quantity is the first which comes to it and then the sensible qualities and the actions, passions and motions which follow the sensible qualities. Therefore in order to be understood, quantity does not require sensible qualities, passions or motions; however, it does require substance. Therefore quantity can be understood without matter which is subjected to motion and sensible qualities but not without substance. Therefore such quantities and those things which happen to them are abstracted, according to understanding, from motion and from sensible matter, but not from intelligible matter, as is said in the seventh book of the *Metaphysics*.

Therefore, because they are so abstracted from motion according to understanding that they do not include in their understanding sensible matter subject to motion, the mathematician can abstract these from sensible matter. Also, whether they are considered with or without sensible matter does not affect the truth of the consideration because, although they are not abstracted in existence, still the mathematicians who so abstract these according to understanding do not speak falsely because they do not assert that these are outside sensible matter (this would be a false statement), rather they consider these without considering the sensible matter and this can be done without making a false statement. For example one can consider whiteness without musical, and truly, although they exist together in the same subject; but it would not be a true consideration if he were to assert that what is white is not musical.

6. Then when he says, "The holders of the theory of Forms . . .", he excludes from the preceding the error of Plato who said that all things which are abstracted according to understanding are abstracted according to existence because he did not see how the intellect could truly abstract those things which are not abstracted according to existence. For this reason Plato not only said that mathematical things are abstracted because the mathematician abstracts from sensible matter; but he said that even natural things are abstracted because natural science treats universals and not singulars. Thus he said that man, horse, stone and similar things are separated, and he said these separated things are ideas; although natural things are less abstract than mathematical, because mathematical things are entirely abstracted from sensible matter according to understanding, because sensible matter is not included in the understanding of mathematical things, neither in the universal nor in the particulars. However, sensible matter is included in the understanding of natural species but not individual matter because flesh and bone are included in the understanding of man but not this flesh and this bone.

7. Then when he says, "This becomes plain if . . .", he shows the given solution in two ways: first by the difference of the definitions which the mathematician and the philosopher of nature give; secondly by the *scientiae mediae* where he says, "Similar evidence is supplied . . ." He says first therefore that what was said about the diverse mode of consideration of the mathematician and the physicist becomes evident if one were to attempt to state the definitions of natural things and of mathematical things and of their accidents because the mathematical things, as odd and even, straight and curved, number, line and figure are defined without motion and matter. However, this is not true of man, flesh, and bone; rather the definition of these latter is like the definition of *snub* in whose definition the sensible subject, namely *nose,* is posited; they are not like the definition of *curved* whose definition does not require a sensible subject. Thus it is apparent from these definitions of natural and mathematical things that what was said above about the difference between mathematical and natural sciences is true.

8. Then when he says, "Similar evidence is supplied . . .", he proves the same thing by the sciences which are found between

mathematics and the philosophy of nature. Moreover, these are called *scientiae mediae* because they take the principles abstracted from the purely mathematical sciences and apply them to sensible matter; for example perspective applies to the visual line those things which are demonstrated by geometry about the abstract line and harmony, i.e. music, applies to sounds that which the arithmetician considers about the proportions of numbers and astronomy applies the consideration of geometry and arithmetic to the heavens and their parts. However, such sciences, although they are midway between natural science and mathematics are nevertheless said here by the Philosopher to be more natural than mathematical because each thing is denominated and has its species from the term. Thus, because the consideration of these sciences is terminated in natural matter although they proceed by mathematical principles, they are more natural than mathematical. He says therefore that such sciences are quite different from those which are purely mathematical, as geometry and arithmetic, because geometry does consider the line which has existence in sensible matter, which is the natural line, but it does not consider it insofar as it is in sensible matter, according to which it is natural, rather it considers it abstractly, as was said. But perspective, on the other hand, takes the abstracted line as it is in mathematical consideration and applies it to sensible matter. Thus the latter treats it insofar as it is physical but not insofar as it is mathematical. Therefore what was said above is clear from the difference which exists between the *scientiae mediae* and the purely mathematical sciences because if such *scientiae mediae* apply the things abstracted to sensible matter it is clear that mathematics, on the contrary, abstracts those things which exist in sensible matter.

9. From this the reply to that which was objected above about astronomy is evident. Thus astronomy is more natural than mathematical. Thus also it is not wonderful if it agrees in its conclusions with natural science because that which demonstrates the same conclusion through another middle term is not purely natural; for example the sphericity of the earth is demonstrated by the philosophy of nature by a natural middle term, namely that its parts equally and on all sides come together at the middle, but it is demonstrated by the astronomer from the shape of the lunar eclipse or by the fact that the same stars are not seen from all parts of the earth.

LESSON IV

PHYSICS CONSIDERS NOT ONLY THE MATTER BUT ALSO ANY FORM EXISTING IN MATTER.

1. After the Philosopher shows the difference between the philosopher of nature and the mathematician, he here shows to what things the consideration of the philosopher of nature extends. About this he does two things: first he shows that the philosopher of nature considers form and matter; secondly he shows what the term of the natural consideration about the form is where he says, "How far then must the physicist . . ." About the first he does two things: first he concludes the proposition from the premisses; secondly he raises doubts about what was determined where he says, "Here too indeed one might . . ."

2. He says first therefore that because nature is said in two ways, namely of the matter and of the form, as was said above, we must consider things in natural science just as when we seek to find the what it is of *snub,* because in the latter we consider not only the form, i.e. curvature, but also the matter, i.e. nose. Thus in natural science there is neither a consideration without sensible matter nor a consideration of matter alone, rather every consideration is of the matter along with the form.

Notice that this process of Aristotle contains two middle terms. By one of them we can argue as follows: The philosopher of nature should consider nature; but nature is both form and matter; therefore he should consider both form and matter. By the other we get the following argument: The philosopher of nature differs from the mathematician, as was said, because the consideration in the philosophy of nature is like the consideration of *snub* but the consideration in mathematics is like the consideration of *curved;* but the consideration of *snub* is a consideration of form and matter; therefore the consideration in the philosophy of nature is a consideration of both.

3. Then when he says, "Here too indeed one might . . .", he raises a twofold doubt about the preceding. The first is as follows: Since nature is said of the matter and of the form, does natural science consider matter alone, form alone or that which is composed of both? Then there is another question: Supposing that natural science considers both, is it the same natural science

which considers the form and the matter or a different one for each?

4. Then when he says, "If we look at the ancients . . .", he resolves the preceding doubts, putting greater emphasis on the second by showing that the same natural science considers the form and the matter, because the first question seemed to have been sufficiently answered when he said that the consideration in the philosophy of nature is like seeking the what is it of *snub*. Therefore about this he does two things: First he states what the ancients seemed to think. He says that if one wishes to examine the statements of the ancient naturalists it seems that natural science treats only matter because either they did not treat the form at all or they said very little about it; for example Democritus and Empedocles touched upon it somewhat insofar as they said that something comes to be from many things according to a determined manner of mixture and congregation.

5. Secondly where he says, "But if on the other hand art imitates nature . . .", he shows the proposition by three arguments, the first of which is as follows: Art imitates nature; therefore natural science should be to natural things as artificial science is to artificial things. But the same artificial science knows the matter and the form up to some definite term; for example the doctor knows health as a form and bile, phlegm and the like as the matter in which health exists because health consists in tempering the humors, and likewise the builder considers the form of the house as well as the bricks and wood which are the matter of the house, and it is the same in all the other arts. Therefore it belongs to the same natural science to know both the form and the matter.

6. The argument for the statement *Art imitates nature* is as follows: The principle of artificial operation is knowledge; but all of our knowledge is drawn from sensible and natural things through sense: thus we produce a likeness of natural things in artificial things. Therefore natural things are imitable through art because all of nature is ordered to its end by some intellective principle so that thus the work of nature seems to be a work of intelligence to the extent that it proceeds towards definite ends by determined means: which art also imitates in its operation.

7. He gives the second argument where he says, "Again, 'that for the sake of which' . . ." The same science considers the end

and those things which are for the end because the reason [*ratio*] of those things which are for the end is taken from the end; but the nature which is form is the end of matter; therefore the same natural science considers the matter and the form.

8. He proves that the form is the end of matter as follows: In order that something be the end of some continuous motion two things are required. One is that it must be the end [*ultimum*] of the motion and the other is that it be *that for the sake of which something comes to be* because something can be the ultimate but not that for the sake of which something comes to be; thus it does not have the reason of end. Also, because it is the reason of the end to be that for the sake of which something comes to be, one of the poets said, speaking in jest, *the end for the sake of which something comes to be* because this seemed useless, just as if one were to say *man animal* because animal is of the reason of man just as *that for the sake of which something comes to be* is of the reason of end. The poet meant that not every ultimate is an end but only that which is ultimate and best. which is that for the sake of which something comes to be. That the form is the ultimate in generation is evident *per se*. That it is that for the sake of which something comes to be with respect to matter he shows by a similitude in the arts. There are some of the arts which produce the matter: some of these produce it simply, as the art of brick-making produces bricks which are the matter of a house; others make it *serviceable*, i.e. they dispose the matter already existing in nature for the reception of the form, as the art of carpentry prepares the wood for the form of the ship. Also we must consider that we use everything made by art as things existing for us because in a way we are the end of all artificial things. He says *in a way* because, as is said in first philosophy, that for the sake of which something comes to be is said in two ways, namely *cuius** and *quo***; for example the end of the house as *cuius* is the inhabitant, the end as *quo* is the dwelling. From this, therefore, we can see that there are two arts which *govern the matter*, i.e. which prescribe the matter for the producing arts, and *have knowledge*, i.e. which judge these; one which uses and another, inducing the form, which makes the artifact. The latter is architectonic with respect to that which

* *cuius*: of which.
** *quo*: for which.

disposes the matter, like ship-building with respect to carpentry which saws the wood. Thus also the art which employs the thing ought to be in a way architectonic or the principal art with respect to that which makes it. Therefore, although each is architectonic, both that which employs and that which makes, they are nevertheless different because the art which employs is architectonic insofar as it knows and judges the form while the other which is architectonic as making the form knows the matter, i.e. it determines the matter. He shows this by an example. The employment of a ship belongs to the captain, thus the governing art is one which employs; as such it is architectonic with respect to ship-building and it knows and determines the form. This is what he means when he says that the captain knows and prescribes what the form of the mast ought to be. But the other, namely the ship-builder, knows and determines from what kinds of wood the ship should be made. Thus therefore it is clear that the art which induces the form directs the art which produces or disposes the matter; but the art which employs the artifact already made directs the art which induces the form. From this we can see that as the matter is to form so the form is to use. But the use is that for the sake of which the artifact comes to be. Therefore the form also is that for the sake of which there is matter in artificial things. Also, just as in those things which are made by art we make the matter because of the work of art, which is the artifact, so in natural things, while the matter which is in them by nature is not made by us, still it has the same order to form, namely that it is for the form.

Thus it follows that the same natural science considers both matter and form.

9. He gives the third argument where he says, "Again, matter is . . .", which is as follows: There is one science of those things which are for something [*ad aliquid*]. But matter is one of those which are for something because it is spoken of with respect to form. This is not said as if matter were in the genus of relation but rather because the proper matter is determined for each form. This is what he means when he adds that under one form there should be one matter and under another, another. Thus it follows that the same natural science considers form and matter.

10. Then when he says, "How far then must the physicist . . .", he shows how far the consideration of natural science about

the form extends. About this he does two things: First he raises this question, namely how far should the natural philosopher consider the form and quiddity of the thing (because to consider the forms and quiddities of things *absolutely* seems to belong to the first philosopher)? Secondly he resolves this by saying that just as the doctor considers the nerves and the smith the bronze up to some term, so also the natural philosopher considers forms. The doctor does not consider nerves as nerves because this belongs to the natural philosopher, rather he considers them insofar as they are the subject of health; so also the smith does not consider bronze as bronze but as the subject of a statue or of something else. Likewise the philosopher of nature does not consider the form as form but as something in matter. Therefore, just as the doctor considers nerves only to the extent that they pertain to health because this is his reason for considering nerves, so also the philosopher of nature considers the form insofar as it has existence in matter.

Therefore the term of the consideration of natural science is found in the forms which are in some way separated but still have existence in matter. The rational souls are forms of this kind because they are separated insofar as the intellective power is not the act of a corporeal organ as the visual power is the act of the eye; but they are in matter insofar as they give existence to such a natural body. He proves that they are in matter by the fact that the form of anything generated from matter is a form in matter because generation is terminated when the form exists in the matter. But man is generated from matter, and by man as by a proper agent and by the sun as by a universal agent with respect to generable things. Thus it follows that the soul which is the human form is a form in matter. Thus the consideration of the philosopher of nature about forms extends to the rational soul.

But how forms which are totally separated from matter exist and what they are or how this form, i.e. the rational soul, exists insofar as it is separable and capable of existing without the body and how it is sepaarble in its own essence, these are questions whose determination belongs to the first philosopher.

LESSON V

IT IS THE TASK OF THE PHYSICIST TO DETERMINE WHAT AND HOW MANY CAUSES THERE ARE.

1. After the Philosopher shows what things natural science considers, he here begins to show from what causes it demonstrates. This is divided into two parts: in the first he determines the causes; in the second he shows from what causes the philosopher of nature demonstrates, where he says, "Now, the causes being four . . ." About the first he does two things: first he shows the necessity of determining the causes; secondly he begins to determine the causes where he says, "In one sense, then, that out of which . . ."

He says first therefore that after we have determined what falls under the consideration of natural science there remains to be considered what and how many causes there are. This is so because this treatise in which we intend to treat of nature is not ordered to operation, but to science because we cannot make natural things but only have science about them. But we do not think we know anything unless we see the *propter quid,* which is to see the cause. Thus it is clear that in studying about generation, corruption and any natural change we are concerned to know the causes and to reduce each of those, whose *propter quid* is sought, to the proximate cause.

He says this because to consider the causes, as such, belongs to the first philosopher: cause as cause does not depend on matter for existence because the nature of cause is found also in those things which are separated from matter. But the philosopher of nature takes on the consideration of causes by necessity; however, he takes upon himself the consideration of causes only to the extent that they are causes of natural changes.

2. Then when he says, "In one sense, then, that . . .", he determines the causes. About this he does three things: first he gives the evident diverse species of causes; secondly he determines some obscure causes where he says, "But chance* also

* The Oxford translation of the *Physics* of Aristotle, from which the text in the *Basic Works of Aristotle* was taken, has in this passage on chance and fortune very confusingly used the term *chance* for *fortune* and *spontaneity* for *chance.* This is made even more confusing when the translators revert, in the later part of this passage, to the terms *fortune* and *chance.*

. . ."; thirdly he shows that there are neither more nor less than those mentioned where he says, "It is clear then . . ." The first of these is divided into two parts: in the first he determines the species of causes; in the second he determines the modes of the various causes according to each species where he says, "Now the modes of causation . . ." About the first he does two things: first he arrives by induction at the various species of causes; secondly he reduces these to four where he says, "All the causes . . ." About the first he does two things: first he gives the diversity of causes; secondly he explains a consequence of the preceding diversity where he says, "As the word has several senses . . ."

3. He says first therefore that in one way *that from which something comes to be when it is in that thing* is called a cause, as bronze is called the cause of the statue and silver the cause of the cup. Even the *genera of these* are said to be the causes of the same things, as metal, what is liquefiable or the like. He adds *when it is in that thing* to show its difference from privation and the contrary, because the statue comes to be from bronze which is in the statue already made. The statue also comes to be from unfigured but the latter is not in the statue already made. Thus bronze is the cause of the statue but unfigured is not, since the latter is only a principle *per accidens*, as was said in the first book.

4. In the second way the *species and exemplar* is called a cause and this is called a cause insofar as it is the quidditative reason [*ratio*] of the thing because this is that through which we know what each thing is. Also, just as, when speaking of matter, we said that the genera of matter were also called causes, so the genera of species are called causes. He gives an example in a consonance of music which is called the diapason whose form is a double proportion which is that of two to one because numeral proportions applied to sounds as to matter constitute the musical consonances. Also, since two or the double is the form of the consonance which is the diapason, so also the genus of two, which is number, is the cause because just as we say that the form of the diapason is the proportion of two to one which is a double proportion, so we can say that the form *diapason* is the proportion of two to one which is multiplicity. To this mode of cause all the parts which are placed in the definition are reduced because the parts of the species and not the parts of matter are

placed in the definition, as is said in the seventh book of the *Metaphysics*. Nor is this contrary to the statement above that matter is placed in the definition of natural things because it is not individual matter which is placed in the definition of the species but common matter; for example in the definition of man we posit flesh and bones but not this flesh and these bones. Therefore the nature of the species constituted of form and common matter is formal with respect to the individual which participates in such nature; to this extent we say here that the parts which are placed in the definition pertain to the formal cause.

Also we must consider that he posited two things which pertain to the quiddity of a thing, namely the species and the exemplar because of diverse opinions about the essences of things. Plato said that the natures of species are certain abstract forms which he called exemplars and ideas; because of this he posited the exemplar or paradigm. But the philosophers of nature, who treated of the form somewhat, posited forms in matter; because of this he gave it the name of *species*.

5. Next he says that in another way *that by which there is a principle of motion or rest* is called a cause; for example one giving counsel is called a cause, the father is the cause of the son and everything that produces change is the cause of that which is changed.

With respect to these causes we must consider that there are four kinds of efficient cause, namely the perfecting, the preparing, the assisting and the counseling. The *perfecting* cause is that which completes the motion or change, as does that which introduces the substantial form in generation. The *preparing* or *disposing* cause is that which adapts the matter or subject for the ultimate completion. The *assisting* cause is that which does not operate for its own end but for the end of another. The *counseling* cause, in those things which act by intention, is that which gives the agent the form by means of which it operates because the agent by intention acts by means of its own science which the counseling cause gives it; just as in natural things that which is generating is said to move heavy or light things insofar as it gives them the form by means of which they are moved.

6. As the fourth mode of cause he says that something is called a cause as the end. This is *that for the sake of which* something comes to be, as health is said to be the end of walking.

This is clear because it answers the question: *For what reason*?* Because when we ask, *For what reason does he walk*? The answer is, *In order that he might become healthy.* By saying this we feel that we have assigned the cause. He goes to greater lengths to prove that the end is a cause than he does for the others because this is less evidently a cause for the reason that the end is last in generation.

He adds further that everything which is intermediate between the first mover and the ultimate end is in a way an end; for example the doctor, in order to produce health, reduces the body, and thus health is the end of the reducing, moreover the reducing is accomplished by purgation, the purgation by drugs and the drugs are prepared by instruments. Thus all these are in a way ends because reducing is the end of purgation, purgation the end of the drugs, the drugs the end of the instruments and the instruments are ends in the operation of or search for instruments. Thus it is plain that these intermediates differ from one another insofar as some are instruments and some are works performed by instruments. He mentions these less anyone believe that only that which is last is the cause as that *for the sake of which* because the name *end* seems to indicate something ultimate. Therefore not every end is ultimate *simpliciter* but only with respect to some one thing.

Finally he concludes that perhaps causes are spoken of in just so many ways. He adds *perhaps* on account of the *per accidens* causes, for example chance and fortune.

7. Then when he says, "As the word has several senses . . .", he shows three consequences from the aforesaid diversity of causes. The first of which is that, since causes are said in many ways, it can happen that there are many *per se* and not *per accidens* causes of one and the same thing; for example the sculptor's art is the cause of the statue as efficient, the bronze as matter. Thus it is that we sometimes assign many definitions of one thing according to diverse causes, but the perfect definition is made up of all the causes.

The second consequence is that some things are causes of each other according to a diverse species of cause; for example work is the efficient cause of a good habit but the good habit is the final cause of the work because there is nothing to prevent some-

* *Propter quid.*

thing from being prior and posterior to another according to different reasons. The end is prior according to reason but it is posterior in existence, but the opposite is true of the agent. Likewise the form is prior to matter according to the reason of completion, but matter is prior to the form in generation and time in everything which is moved from potency to act.

The third consequence is that the same thing is sometimes the cause of contraries, for example the captain by his presence is the cause of the safety of the ship, but by his absence he is the cause of its sinking.

8. Then when he says, "All the causes now mentioned . . .", he reduces all the causes numerated above to four species. He says that all the causes which were enumerated above are reduced to four modes which are manifested. The *elements*, i.e. the letters, are the cause of syllables; earth is the cause of the vase and silver of the cup; fire and similar simple bodies are causes of bodies; again any parts are the cause of the whole; and *suppositions*, i.e. the propositions of the syllogism, are the cause of the conclusion. All these have one reason of cause insofar as that from which something comes to be is called a cause, because this is common to all the preceding. However, of all those now enumerated some are as matter and some as form which causes the quiddity of a thing: for example all parts are as matter, as the elements of syllables and the four elements of mixed bodies, but those things which bring in the whole, the composition or any species is in the nature of form so that species is referred to the forms of simple things but whole and composition to the forms of composite things.

9. However, there seem to be two doubts about this. The first arises from the fact that he says that the parts are the material cause of the whole while above he reduced the parts of the definition to the formal cause. However, we can say that above he was speaking of the parts of the species which fall in the definition of the whole while here he is speaking of the parts of matter in whose definition the whole falls, just as the circle falls in the definition of the semi-circle. But it would be better to say that although the parts of the species which are posited in the definition are compared to the suppositum of the nature in the manner of a formal cause, still they are compared to the nature itself of which they are parts, as matter because all parts are compared

to the whole as the imperfect to the perfect which is a comparison of matter to form.

Again there is a doubt about his statement that the propositions are the matter of the conclusion because the matter is in that of which it is the matter; thus above, when he was showing the material cause, he said that it is that from which something comes to be *when it is in that thing,* but the propositions are separate from the conclusion. However, it must be said that the conclusion is made up of the terms of the propositions; thus in this way the propositions are said to be the matter of the conclusion insofar as the terms which are the matter of the propositions are also the matter of the conclusion, but not in the way they are found under the order of the propositions. For example flour is said to be the matter of bread but not in the way that it exists under the form of flour. Therefore it was better to say that the propositions are the matter of the conclusion rather than the opposite because the terms which are joined in the conclusion are posited separately in the premisses. Therefore, so far we have two modes of cause.

10. But some things are said to be causes according to another reason, namely because they are the principle of motion and rest. In this way the semen, which is active in generation, is called a cause; also in this way the doctor is called the cause of health, the one counseling and everything producing is called a cause in this way.—Another text has *and propositions* because propositions, as to their terms, are the matter of the conclusion, as was said; but as to their illative force they are reduced to this genus of cause because the principle of the discourse of reason to the conclusion is from the propositions.

11. Another reason of cause is found in the other causes according as the end or the good has the reason of cause. This species of cause is the most powerful of all the causes because the final cause is the cause of the other causes. For it is evident that the agent acts for the sake of the end, and similarly it was shown above in artificial things that the forms are ordered to use as to the end and matters are ordered to forms as to the end. Thus to this extent the end is called the cause of causes. Also, because he had said that this species of cause has the reason of good and because sometimes we find in those things which act through choice that the end is bad, in order to remove this doubt he says

that it makes no difference whether the final cause is truly good or apparently good because the apparent good moves only under the reason of good. Thus finally he concludes how many species of causes there are and what they are called.

LESSON VI

ABOUT THE VARIOUS MODES OF CAUSES AND ABOUT THOSE THINGS WHICH FOLLOW THE VARIOUS MODES OF CAUSING.

1. After the Philosopher has distinguished the species of causes, he here distinguishes the diverse modes of causes even in the same species of cause. About this he does two things: first he distinguishes the diverse modes of causes; secondly he determines a consequence of the preceding distinction where he says, "The difference is this . . ." About the first he does two things: first he distinguishes the diverse modes of causes; secondly he reduces them to a certain number where he says, "All these various uses . . ." For the first he distinguishes the modes of causes according to four divisions.

He says first therefore that there are many modes of causes but, if they are put under headings or in a summary according to something common, they are found to be few. Or the term *capitales* can be taken to mean combinations because it is evident that there are fewer combinations of the modes than there are modes.

2. Therefore the first division or combination of modes is that in the same species of cause one cause is said to be prior to another, meaning by prior the more universal cause, for example the cause of health as the proper and posterior cause is the doctor, but as more common and prior, the artist. This is in the species of efficient cause. It is similar in the species of formal cause because the proper and posterior formal cause of the diapason is the double proportion but the prior and more common is numeral proportion which is called multiplicity. Likewise that which contains each cause in the community of its scope is called a prior cause.

3. However, it should be noted that universal and proper cause, or prior and posterior, can be taken either according to community of predication, as in the example given of the doctor and the artist, or according to community of causality, as if we were to say that the sun is the universal cause of heating, but that fire is the proper cause. These two correspond to each other because it is evident that a virtue is extended to things insofar as these have one common reason of object, and insofar as it is extended to more things it should be a more common reason; and, since the virtue is proportional to the object according to its reason, it follows that the superior cause acts according to a more universal and less contracted form. The same must be considered in the order of things because to the extent that things are superior in being they have forms which are less contracted and which dominate to a greater degree the matter which contracts the virtue of the form. Thus, also, that which is prior in causing is found to be prior in a way according to the reason of more universal predication, for example, if fire is the first heating agent, the heavens are not only the first heating agent but also the first altering agent.

4. He gives the second division where he says, "Another mode of causation . . ." He says that just as the *per se* causes are divided into prior and posterior or common and proper causes, so also are the causes *per accidens*. There are, besides the *per se* causes. also *per accidens* causes and their genera; for example the *per accidens* cause of the statue is Polycletus, but the *per se* cause is that making the statue because Polycletus is the cause of the statue insofar as he happens to be the one making the statue. Also those things which, in their community, contain Polycletus are the *per accidens* cause of the statue, for example man and animal.

Likewise we must consider that in the *per accidens* causes some are nearer to the *per se* causes and some are more remote because everything which is joined to the *per se* cause which is not of its reason is called a *per accidens* cause; but this can be nearer to the reason of the cause or more remote from it; thus in this way the *per accidens* causes will be nearer or more remote. For example, if it happens that the one making the statue is white and musical, musical is nearer [to the *per se* cause] because it is in the same subject and according to the same thing,

namely according to the soul, in which music and the art making the statue are found; but white is in the body. But the subject is nearer than the other accidents, for example Polycletus, than white or music because the latter are only joined to the one making the statue because of the subject.

5. He gives the third division where he says, "All causes, both proper and . . ." He says that besides the causes properly so called, i.e. the *per se* and *per accidens*, some are called causes in potency, as those capable of operating, others are spoken of as actually operating; for example the cause of building a house can be said to be one with the habit of building or one who is actually building.

6. Also, just as causes are distinguished in the aforesaid ways, similarly those things of which they are the cause are distinguished because, in the thing caused, there is something posterior and more proper and something which is prior and more common; for example we might say that something is the cause of this statue or of statue in general, and if we were to say that it was the cause of an image this would be even more common; likewise, if we were to call something the motive cause of this bronze, or bronze in general or of matter. Thus we can say also that in *per accidens* effects there is something more common and less common. That is called a *per accidens* effect which is joined to a *per se* effect and is outside its reason; for example the *per se* effect of cooking is tasty food, but the *per accidens* effect is healthful food; for the doctor the opposite is true.

7. He gives the fourth division where he says, "Again we may use a complex . . ." He says that sometimes the *per se* causes are taken complexly with the *per accidens* causes, as if we were to say that the cause of the statue is not Polycletus, who is a *per accidens* cause, nor the statue maker, who is a *per se* cause, but Polycletus the statue maker.

8. Then when he says, "All these various . . .", he reduces the preceding modes to a definite number. He says that the number of the preceding modes is six, but each of these is said in two ways. The six modes are as follows: the singular and the genus, which he called above the prior and posterior; accident and the genus of accident; simple and complex. Each of these is divided by potency and act. Thus there are twelve modes altogether. He

distinguishes all the modes by potency and act because that which is in potency is not *simpliciter.*

9. Then when he says, "The difference is this . . .", he determines three consequences of the preceding distinction of modes. The first is that there is this difference between causes in act and causes in potency: causes actually operating are and are not at the same time as those things of which they are the causes in act, provided that we take singular, i.e. proper, causes; for example this man healing exists and does not exist at the same time as this one who is being healed, and this one building at the same time as that which is being built. However if we take actual causes which are not proper, this is not true because building does not necessarily exist and not exist together with that which is built because it could happen that there is building in act and still it is not this building which is being built but another. But if we are speaking about the building of this edifice, and this edifice insofar as it is in the process of being built, it is necessary that when one is posited the other must be also and when one is removed the other is also removed. But this does not always happen in causes which exist in potency because the house and the man who builds it are not corrupted at the same time.

Thus we see that just as inferior agents, which are the causes of things insofar as these come to be, must exist at the same time as those which come to be while they come to be, so also the divine agent which is the cause of actual existing must exist at the same time as the existence of the thing in act. Thus if we were to take away the divine action from things they would fall into nothingness, just as if the sun were removed there would be no light.

10. He gives the second consequence where he says, "In investigating the cause . . ." He says that in natural things we should always demand the supreme cause of each thing, just as is done in artificial things. For example if we were to ask why this man is building we would say that it is because he is a builder and if we were to ask why this man is a builder we would say that it is because he has the art of building, and we would stop here because this is the first cause in this order. Likewise, in natural things, we should proceed up to the supreme cause because the effect is not known unless the cause is known. Thus if the cause of some effect is also the effect of another cause we

could not know the former unless we knew the latter cause, and thus we would arrive at the first cause.

11. He gives the third consequence here he says, "Further, generic effects . . ." This is that the effects should correspond proportionally to the causes so that general effects are attributed to general causes and singular effects to singular causes; for example the one making a statue is the cause of a statue and the one making this statue is the cause of this statue. Likewise effects in potency corresond to causes in potency, and effects in act to causes in act.

Finally, in summing up, he concludes that there has been a sufficient determination of the species and modes of the causes.

LESSON VII

DIVERSE OPINIONS ABOUT FORTUNE AND CHANCE

1. After the Philosopher has determined the evident species and modes of causes he here determines certain less evident modes, namely fortune and chance. About this he does two things: first he states his intention; secondly he follows it out where he says, "Some people even question . . ."

He says first therefore that fortune and chance are also counted among the causes since many things are said to come to be and exist because of fortune and chance. Therefore we must consider three things about these; namely in what way they might be reduced to the preceding causes, again whether fortune and chance are the same or whether one is one thing and the other another, and finally what chance and fortune are.

Then when he says, "Some people even question . . .", he begins to determine fortune and chance. First he gives the opinions of others; secondly he determines the truth where he says, "First then we observe that . . ." For the first he gives three opinions: the second begins where he says, "There are some too who ascribe . . ."; the third, where he says, "Others there are who . . ." About the first he does two things: first he gives the opinion of those who deny fortune and chance and their arguments; secondly he argues against one of the reasons where he says, "But there is a further circumstance . . ."

2. He says first therefore that some doubted whether fortune and chance existed and they denied these for two reasons. The first is that all those things which are said to come to be by chance or fortune are found to have some determined cause other than fortune. He gives the following example: If a man coming to the marketplace were to find a man whom he wished to find, one moreover who he had not thought previously would be found there, we say that the finding of this man is by fortune. But the cause of finding this man is the desire to buy something, for which reason he went to the marketplace where this man whom he found was. It is the same in all the other things which are said to be by fortune because they have some other cause besides fortune. Thus fortune does not seem to be the cause of anything and consequently it does not exist because we do not say that fortune exists unless we say that something exists by fortune.

3. He gives the second argument where he says, ". . . for if chance* were real . . ." He says that if fortune exists it would seem to be illogical (as it truly is illogical, as will be shown below) and to raise a doubt as to why none of the ancient wise men who determined the causes of generation and corruption treated of fortune; rather it seems that these ancients thought that nothing exists by fortune. Thus this second argument is taken from the opinion of the ancient naturalists.

4. Then when he says, "But there is a further circumstance . . .", he argues about this second reason, showing what he had supposed above, namely that it is illogical that the ancient naturalists did not treat of chance and fortune. He proves this by two arguments. The first is that it seems surprising, as it really is, that the ancient naturalists did not treat of chance and fortune because they assumed that they were determining the causes of those things which come to be. But there are many things which come to be by fortune and chance. Therefore they should have treated fortune and chance. Nor are they excused for the reason given above which destroys fortune and chance, because even though these men knew that it is possible to reduce each effect to some cause, as the above opinion destroying fortune and chance stated, still they said, in spite of this opinion, that some things come to be by fortune and some do not. Thus these philos-

* Cf. the note given above on page 115.

ophers of nature should have mentioned fortune and chance, at least to the extent of showing that it is false to say that some things come to be by fortune and chance and to the extent of giving a reason why some things are said to be by fortune and some are not. Nor can they be excused by the fact that chance and fortune could be reduced to one of the causes which they had posited, because they did not think that fortune is one of the things which they thought to be causes, for example friendship, strife or something of the sort.

5. He gives the second argument where he says, "This is strange . . ." He says that it is illogical that the ancient naturalists neglected to treat of fortune whether they thought that fortune exists or not because, if they thought that fortune exists, it was illogical that they did not treat of it; but, if they did not think that fortune exists, it was illogical that they sometimes employed it, as did Empedocles who said that air is not always gathered together above the earth as if this were natural to it, but because this happens by chance. He said that when the world was made, with strife distinguishing the elements, it happened that air was collected in its present place and as it happened then so it will always be as long as the world remains in its present state. However, in the other worlds, which he said came to be and were corrupted infinitely many times as was said above, air would be otherwise ordered among the parts of the universe many times, likewise he said that most parts of animals come to be by fortune, for example when the world was first made heads were produced without the neck.

6. Then when he says, "There are some too . . .", he gives the second opinion. About this he does two things: first he states it; secondly he disproves it where he says, "This statement might well . . ." He says first therefore that some said that chance is the cause of the heavens and of all parts of the world; also they said that the revolution of the world and the motion of the stars which distinguishes and establishes the whole inferior universe in its order is by chance. This seems also to be the opinion of Democritus who said that the heavens and the whole world were fortuitously established by the collision of *per se* mobile atoms.

7. Then when he says, "This statement might well . . .", he disproves this position by two arguments. The first is that it seems surprising that animals and plants do not come to be by

fortune but by intellect, nature, or some other determined cause; which is plain from the fact that nothing is generated from just any seed but rather man is produced from one determined seed and the olive from another determined seed. Since these inferior things are not produced by fortune, it is surprising that the heavens and those things which are more divine among the sensible things evident to us, namely the eternal parts of the world, are by chance and do not have a determinate cause as do animals and plants. If this be true then it would certainly be worthwhile to investigate this and give a reason why it was so. However, the ancients neglected it.

8. He gives the second argument where he says, "For besides the other absurdities . . .", saying: How can it be true that the celestial bodies exist by chance and the inferior bodies do not? In addition to the fact that it is illogical because these bodies are more noble, it is even more illogical according to the things which we see because we see that nothing comes to be by chance in the heavens but in the inferior bodies, which they say do not exist by chance, we see many things happening by fortune. According to their position it would be more reasonable for the opposite to happen, namely that some things would be found to come to be by chance or fortune in those things of which chance or fortune is the cause but not in those things of which it is not the cause.

9. Then when he says, "Others there are who . . .", he gives the third opinion about fortune. He says some thought that fortune is a cause but that it is not evident to the human intellect, as if it were something divine and above men because these thinkers believed that all fortuitous events were reduced to some divine ordering cause, just as we say that all things are ordered through Divine Providence.

But, although this opinion has a true foundation, still they do not make proper use of the name *fortune* because that divine ordering power cannot be called or named *fortune* because to the extent that something participates in reason or order it lacks the nature of fortune. Thus fortune should better be called an inferior cause which does not have of itself an order to the fortuitous event, rather than a superior cause as if it were that by which the ordering takes place. However, he passes over the investigation of this opinion both because it exceeds the limits

of natural science and because below he shows that fortune is not a *per se* cause but rather *per accidens*. Thus by those things which follow it will be more evident how he stands on these opinions. Therefore he concludes that, in order to understand these opinions, we must consider what fortune and chance are; whether they are the same or different; and how they are reduced to the preceding causes.

LESSON VIII

AFTER GIVING SOME DIVISIONS OF EFFECTS AND CAUSES HE CONCLUDES THE DEFINITION OF FORTUNE.

1. After the Philosopher has given the opinions of others about fortune and chance he here determines the truth. This is divided into three parts: in the first he shows what fortune is; in the second, how it differs from chance where he says, "They differ in that . . ."; in the third, to what genus of cause chance and fortune are reduced where he says, "Both belong to the mode of causation . . ." The first part is divided into two: in the first he shows what fortune is; in the second, from the definition of fortune, he gives the reason of those things which are said about fortune where he says, "It is necessary, no doubt . . ." About the first he does three things: first he gives some divisions for investigating the definition of fortune; secondly he shows under which members of those divisions fortune is contained where he says, "To resume then . . ."; thirdly he concludes the definition of fortune where he says, "It is clear then that . . ." Also, because fortune is posited as a kind of cause, in order to know the cause we must know of what things it is the cause; thus he first gives a division on the part of that of which fortune is the cause. Secondly he gives a division on the part of the cause itself where he says, "Things of this kind . . ."

2. For the first he gives three divisions. The first is that some things always come to be, as the rising of the sun; others frequently happen, as a man being born with eyes. Neither of these is said to be by fortune. But some things come to be *besides*

these two, i.e. they happen seldom, as when a man is born with six fingers or without eyes; and all say that these latter come to be by fortune. Thus it is clear that fortune is something, since *to be by fortune* and *to be seldom* are convertible. He induces this against the first opinion which denied fortune.

3. However, it seems that this division of the Philosopher is inadequate because there are also some things which can be directed towards either of two things. Therefore Avicenna said that in those things which can be directed towards either of two things we also find something which is by fortune just as in those which happen seldom. Nor does it make any difference that we do not say that it is by fortune that Socrates is seated, although this is something which can be directed to either of two things, because although this is something that can be directed to either of two things with respect to the motive potency, still it is not something which can be directed towards either of two things with respect to the appetitive potency which tends determinately to one thing. If something were to happen other than this latter, this would be called fortuitous. But just as the motive potency which can be directed towards either of two things passes into act only through the appetitive potency which is determined towards one thing, so everything which can be directed towards either of two things passes into act only through something which is determined to one thing because that which can be directed towards either of two things is like being in potency; but it is not potency which is the principle of acting, but act. Thus nothing follows from the fact that something can be directed towards either of two things except through something else which determines it to one thing, either as something which happens always or something which happens frequently. For this reason, in those things which come to be, he passed over those which can be directed to either of two things.

4. Also it should be noted that some have defined the necessary as that which does not have an impediment and the contingent as what happens frequently but which can be impeded in a few cases. But this is irrational because that is said to be necessary which in its nature cannot not be, but the contingent which happens frequently is that which can not be. The contingent is that which has an impediment or does not have it because nature does not prepare an impediment for that which cannot not be because it would be superfluous.

5. He gives the second division where he says, "But, secondly, some events . . ." He says that some things come to be because of an end and some do not. However, there is a doubt about this division because every agent acts for an end, whether it acts by nature or whether it acts by intellect. But it must be said that he here says that those things do not come to be because of something which come to be because of themselves, insofar as they have a delight or dignity in themselves on account of which they are pleasing in themselves. Or he means that those things do not come to be for an end which do not come to be because of a deliberated end; for example rubbing one's whiskers or something similar, which occasionally takes place without deliberation from the motion of the imagination alone. Thus it has an end given by the imagination but not by deliberation.

6. He gives the third division where he says, "Again, some of the former . . ." He says that of those things which come to be for an end some come to be according to the will and some do not. Both these are found in those things which come to be because of something because not only those which come to be by a will but also those which come to be by nature come to be because of something.

7. Also, because those things which come to be by necessity or which come to be frequently both come to be by nature or by intention, it is clear that both in those which always come to be and in those which frequently come to be there are some which come to be because of an end, since both nature and intention operate because of an end. Thus it is plain that these three divisions include each other because those things which come to be by intention or by nature come to be because of an end and those which come to be because of an end come to be always or frequently.

8. Then when he says, "Things of this kind . . .", he gives a division which is taken on the part of the cause. He says that when *things of this kind,* namely which are by intention, because of something and seldom, come to be by an accidental cause, then we say they are by fortune. Just as some beings are *per se* and some *per accidens,* so also are causes; for example the *per se* cause of the house is the builder's art but the *per accidens* cause is white or musical.

But we must consider that a *per accidens* cause is so called in

two ways: in one way on the part of the cause, in another way on the part of the effect. That is called a *per accidens* cause on the part of the cause when something is joined to the *per se* cause, as when white or musical is called a cause of the house because of being accidentally joined to the builder. A cause is said to be *per accidens* on the part of the effect when something is taken as accidentally joined to the effect, as when we say that the builder is the cause of dispute because there is a dispute about the home which he made. It is in this latter way that fortune is a *per accidens* cause because something is accidentally joined to the effect, for example when the finding of a treasure is accidentally joined to the digging of a grave, because just as the *per se* effect of a natural cause is that it follow according to the exigency of its form, so the effect of an agent acting by intention is that it happen by the intention of the agent. Thus whatever is found in the effect outside the intention is *per accidens*. This is true if that which is outside the intention is that which happens seldom because what is always or frequently joined to the effect falls under the same intention because it is stupid to say that one intends something and does not wish that which frequently or always is joined to it. Then he gives a difference between the *per se* and the *per accidens* cause because the *per se* cause is finite and determined but the *per accidens* is infinite and undermined because those things which can happen to any one thing are infinite.

9. Then when he says, "To resume then . . .", he shows under which members of the preceding divisions fortune is contained and what fortune is. He says first that fortune and chance, as was said before, are among those things which come to be because of something. However, the difference between chance and fortune will be determined later. But now he should show that both are contained among those things which act for an end, for example, if one knew he would receive some money in the marketplace, he would go there to get it; but if he did not go to the market for this reason, it is *per accidens* that his arrival results in getting the money, i.e. that it have this effect. Thus it is plain that fortune is a *per accidens* cause of those things which are for the sake of something. Likewise it is clear that it is a cause of those things which happen seldom because this getting the money is said to come about by fortune when the getting of money upon

coming to the city is neither from necessity nor something that happens frequently. Again it is found in those things which come to be by intention because the getting of money which is said to come about by fortune is the end of those causes which come to be according to intention or by intellect but not of those which are according to themselves as in those things which come about by nature. But if one by intention were to go in order to get money or if he got it always or frequently when he came, this would not be said to be by fortune; for example, if one frequently or always gets his feet wet when he walks in a muddy place, this is not said to be by fortune even though he does not intend it.

10. Then when he says, "It is clear then that . . .", he concludes from the premisses the definition of fortune. He says that it is clear from the premisses that fortune is *a per accidens cause in those things which come about according to intention, because of an end and which happen seldom.* From this it is plain that fortune and intellect are about the same things because to act by fortune belongs only to those which have intellect because intention and will are not found without intellect. Also, although only those which have intellect act by fortune, still to the extent that one is more subject to the intellect he is less subject to fortune.

LESSON IX

HE GIVES THE REASON OF THOSE THINGS WHICH ARE SAID BY THE ANCIENT PHILOSOPHERS, AND COMMONLY BY MEN, ABOUT FORTUNE.

1. Having given the definition of fortune, here from the premisses he gives the reason of those things which are said about fortune: first of those things which were said by the ancient philosophers about fortune; secondly of those which are said commonly by men where he says, "Thus to say that . . ." Moreover, he gave above three opinions about fortune and chance, the second of which he proved to be entirely false because it stated that fortune is the cause of the heavens and all things in

the world. Thus, abstracting from the second opinion, he first shows how the third opinion which says that fortune is inevident to man is true; secondly, how the first opinion which says that nothing comes to be by fortune and by chance is true where he says, ". . . and why it might be thought . . ."

Moreover, because it was said above that *per accidens* causes are infinite and again that fortune is a *per accidens* cause, he concludes from the premisses that there are infinite causes of that which is by fortune. Also, because the infinite, as infinite, is unknown fortune is not evident to man.

2. Then when he says, ". . . and why it might be thought . . .", he shows how the first opinion is true. He says that in a way it is true to say that nothing happens by fortune because all the things said by others about fortune are in a way said rightly because there is a reason for saying them. Since fortune is a *per accidens* cause, it follows that to be by fortune is something accidental; moreover, what is *per accidens* is not, simply speaking; thus it follows that, simply speaking, fortune is the cause of nothing. He shows what he had said about each opinion by examples. He says just as the builder is simply the *per se* cause of the house while the flute-player is the *per accidens* cause; similarly the fact that one comes to a certain place not for the sake of getting some money is the *per accidens* cause of getting it. But this *per accidens* is infinite because a man can go to that place for infinitely many other causes, for example to visit someone, to follow an enemy, to evade a pursuer, or to see a show. All these and others like them are the cause of getting the money which happened by fortune.

3. Then when he says, "Thus to say that . . .", he gives the reason for those things which are commonly said of fortune. First he gives the reason why fortune is said to be without reason; secondly, why fortune is said to be good or bad where he says, "Fortune is called good . . ." About the first he does two things: first he shows the proposition; secondly he raises a doubt where he says, "Yet in some cases . . ."

4. He says first therefore that fortune is rightly said to be without reason because we can reason only about those things which are always or frequently, but fortune is outside of each. Therefore because such causes, happening seldom, are *per accidens*, infinite and without reason it follows that fortunes are in-

finite causes and without reason because every *per se* cause produces its effect either always or frequently.

5. Then when he says, "Yet in some cases . . .", he raises a doubt. He says that although fortune is said to be a *per accidens* cause, still *some might raise a question,* i.e. some will doubt this. The doubt is whether any causes which happen to be *per accidens* should be called the cause of that which comes about by fortune. For example it is plain that nature or the doctor's art can be the *per se* cause of health but all those things by whose happening one became healthy, as the fresh air, i.e. the breeze, the hot weather or shaving one's head can be called *per accidns* causes. Therefore why is any of these a cause *per accidens?* But because we said above that fortune is particularly called a *per accidens* cause on the part of the effect, namely insofar as something is said to be the cause of that which happens to the effect, it is clear that a fortuitous cause operates for a fortuitous effect, although it does not intend this but rather something else connected to the effect. In this way the breeze or the hot weather can be called fortuitous causes of health insofar as they cause an alteration in the body from which health follows, but cutting the hair or something of the sort does not obviously cause anything with respect to health. But still some of the *per accidens* causes are more proximate and others more remote and those which are more remote seem less to be causes.

6. Then when he says, "Fortune is called . . .", he gives a reason why fortune is called good or bad. First he gives the reason why, simply speaking, fortune is called good or bad. He says that fortune is called good when something good happens and bad when something bad happens.

7. Secondly where he says, "The terms 'good fortune' . . .", he gives a reason for good fortune and misfortune. He says that we use the terms good fortune and misfortune when there is some great good or evil because we call it good fortune when some great good follows and misfortune when it is a great evil. Also, because to be deprived of good is taken in the nature of evil and to be deprived of evil is in the nature of good, therefore when one is very close to a great good and loses it he is said to be unfortunate and if one is close to a great evil and avoids it he is said to be fortunate. This is true because the intellect takes that which is very close as if there were no difference but had already happened.

8. Thirdly where he says, "Further it is with reason . . .", he gives the reason why good fortune is uncertain. He says this is true because good fortune is a kind of fortune; but fortune is uncertain, since it belongs to those things which do not always happen nor those which frequently happen, as was said. Thus it follows that good fortune is uncertain.

9. Finally, where he says, "Both are, then, as . . .", he concludes in summing up that each, namely chance and fortune, is a *per accidens* cause and each is found in those things which happen not *necessarily,* i.e. not always, nor frequently and each is in those things which come to be because of something, as is plain from what was said above.

LESSON X

THE DIFFERENCE BETWEEN CHANCE AND FORTUNE. THERE ARE NEITHER MORE NOR FEWER THAN FOUR CAUSES.

1. After the Philosopher has determined about fortune and chance as to those things in which they agree he here shows the difference between them. This is divided into two parts: in the first he shows the difference between chance and fortune; in the second he shows in what this difference particularly consists where he says, "The difference between . . ." The first is divided into two parts: in the first he shows the difference between chance and fortune; in the second he recapitulates those things which have been said about each where he says, "Hence it is clear that . . ."

2. About the first he does two things. First he gives the difference between chance and fortune. He says that these differ by the fact that chance is found in more things than is fortune because everything that is by fortune is by chance but the converse is not true.

3. Secondly where he says, "Chance and what results . . ." he shows the preceding difference. First he shows in what things there is fortune. Secondly he shows that chance is found in more things where he says, "The spontaneous on the other hand . . ."

About the first he does two things: first he shows in what things there is fortune; secondly he concludes in what things there is not where he says, "Thus an inanimate thing . . ."

4. He says first therefore that fortune and that which is by fortune are found in those things to which something good is said to happen because in those things in which there is fortune there can be good fortune and misfortune. Moreover, something good is said to happen to him to whom action belongs. He is properly said to act who has dominion over his own act. He who does not have dominion over his own act is acted rather than acting. Therefore act is not in the power of one who is acted but rather of one who himself acts. Also, because the practical or active life belongs to those who have dominion over their own acts (because in these we find operation according to virtue or vice), therefore it is necessary that fortune be about the practical. He induces a sign of this in the fact that fortune seems either to be the same as happiness or very near to it. Thus in common opinion happy people are said to be fortunate because according to those who think that happiness consists in external goods happiness is the same as fortune; but according to those who say that external goods, in which fortune is found to a greater extent, contribute instrumentally to happiness, good fortune is very near to happiness because it is an aid to it. Therefore, since happiness is a kind of operation (because it is *well-doing*, i.e. good operation, namely of perfect virtue, as is said in the first book of the *Ethics*), it follows that fortune is found in those to whom good action is attributed or in those in whom this is impeded. This is what we mean when we say that something good happens or something bad happens. Therefore, since one has dominion over his acts to the extent that he acts voluntarily, it follows that something is found to happen by fortune only in those who act voluntarily, but not in others.

5. Then when he says, "Thus an inanimate thing . . .", from the premisses he concludes in which things there is no fortune. He says that because fortune is only in those who act voluntarily neither inanimate things, boys nor beasts act by fortune because they do not act voluntarily as having free will (which he here calls *deliberate intention*). Thus neither good fortune nor misfortune can happen in these except after a fashion, for example someone said that the stones from which altars are made are

fortunate because honor and reverence is given them while nearby stones are used to walk on. This is said through a similitude to men where those who are honored seem to be fortunate but those who are stepped on are said to be unfortunate. But although it does not belong to the preceding to act by fortune, still nothing prevents them from being the object of fortune when a voluntary agent operates on them, for example we say that it is fortunate when someone finds a treasure or unfortunate when he is struck by a falling stone.

6. Then when he says, "The spontaneous on the other hand . . .", he shows that chance is also in other things. About this he does three things. First he shows that chance is in other things. Secondly he draws a conclusion from what was said where he says, "Hence it is clear that . . ." Thirdly, in order to show this, he induces a sign where he says, "This is indicated by . . ."

7. He says first therefore that chance is found not only in men who act voluntarily, but also in the other animals and even in inanimate things. He gives an example of the other animals, as when it is said that the horse comes by chance when its safety is obtained by coming even though it did not come for the sake of safety. He gives another example in inanimate things. We say that the three-legged stool fell by chance because by chance it stands in such a way that it can be used as a seat, although there was no cause making it fall in such a way that it could be used as a seat.

8. Then when he says, "Hence it is clear that . . .", he concludes from the premisses that in those things which simply come to be because of something, when they do not come to be for the sake of that which happens but rather come to be for the sake of something extrinsic, then we say that they come to be by chance. But among those things which happen by chance only those which happen in individuals having intention are said to be by fortune.

9. Then when he says, "This is indicated by . . .", he shows what he had stated in the conclusion, namely that chance happens in those which are because of something. He takes a sign from that which is called *vain*, which according to the name in Greek is similar to chance. Moreover something is called vain when that which is because of something does not come to be for the sake of that, i.e. when it does not happen from that be-

cause of which it comes to be; for example if one were to walk in order to purge oneself of the superfluities of nature and if this did not happen to the one walking, we would say that he had walked for nothing and his walking was vain. It is as if that which is suitably designed [*aptum natum est*] to take place for the sake of something is *for nothing* or *vain* when it does not perfect that for the sake of which it is designed to take place. He explains why he says *for whose sake it is designed to take place*, because if one were to say that his bathing was for nothing because an eclipse of the sun was not caused by the bathing he would be speaking ridiculously because his bathing was not designed to take place in order that the sun would be eclipsed. Thus chance, which in Greek is called *automaton*, i.e. absolutely for nothing [*per se frustra*], happens in those things which are because of something as does that also which is for nothing or vain because absolutely for nothing signifies according to its name that which is itself for nothing just as *per se* man signifies man himself and *per se* good the good itself. He gives an example of this in those things which come to be by chance as when it is said that the stone which in falling strikes someone did not fall for the sake of striking. Therefore its falling was *per se* vain or absolutely for nothing because it was not designed to fall for that purpose because sometimes a stone thrown by someone falls for the sake of striking. But although chance and the vain agree insofar as each is found in those things which are because of something, still they differ because something is called vain by the fact that that which was intended does not follow, but something is called chance by the fact that something else which was not intended follows. Thus sometimes the vain and chance are the same, when what was intended does not happen but something else does happen. But sometimes it is chance and not vain, when that which was intended and something else happens. Sometimes it is vain and not chance, when neither that which was intended nor anything else happens.

10. Then when he says, "The difference between . . .", he shows in what particularly chance differs from fortune. He says that it differs chiefly in those things which come to be by nature because chance is found there but not fortune. When in the works of nature something takes place outside of nature, for example when someone is born with six fingers, we do not say that

this takes place by fortune but rather by that which is absolutely for nothing, i.e. by chance. Thus we see another difference between chance and fortune because of those things which are by chance the cause is intrinsic as it is of those things which are by nature; but of those things which are by fortune the cause is extrinsic as it is of those which are by intention.—Finally he concludes that we have said what absolutely for nothing, i.e. chance, is; what fortune is; and how they differ from each other.

11. Then when he says, "Both belong to the mode of causation . . .", he shows to what genus of cause chance and fortune are reduced. First he shows the proposition. Secondly, from this, he disproves an opinion given above where he says, "Spontaneity and chance . . ." He says first therefore that both chance and fortune are reduced to the genus of the moving cause because chance and fortune is either the cause of those things which are by nature or of those things which are by intellect, as is plain from what was said. Thus, since nature and intellect are causes as that whence there is a principle of motion, fortune and chance are also reduced to the same genus. However, since chance and fortune are *per accidens* causes, the multitude of these is indeterminate, as was said above.

12. Then when he says, "Spontaneity and chance . . .", he excludes the opinion of those who say that fortune or chance is the cause of the heavens and of all things in the world. He says that because chance and fortune are *per accidens* causes of those things of which intellect and nature are the *per se* causes; but a *per accidens* cause is not prior to that which is *per se*, just as nothing *per accidens* is prior to that which is *per se*; it follows that chance and fortune are causes which are posterior to intellect and nature. Thus, if it be said that chance is the cause of the heavens as some said, it follows that intellect and nature are first the cause of something else and afterwards the cause of the whole universe. Also the cause of the whole universe seems to be prior to the cause of some part of the universe, since any part of the universe is ordered to the perfection of the universe. But this seems illogical, namely that some other cause is prior to that which is the cause of the heavens. Thus it is illogical that chance is the cause of the heavens.

13. Moreover we must consider that if those things which happen fortuitously or casually, i.e. outside the intention of in-

ferior causes, are reduced to some superior cause ordering these then in comparison to that cause these cannot be called fortuitous or casual. Thus that superior cause cannot be called fortune.

14. Then when he says, "It is clear then that . . .", he shows that there are not more causes than those which have been mentioned. He shows this as follows: The question, *For what reason* [*propter quid*], asks the cause; but only some of the causes previously mentioned answer the question, *For what reason;* therefore there are no more causes than those which have been mentioned. This is what he means when he says that there are as many questions asking *For what reason* as there are causes mentioned. Sometimes the for what reason is reduced ultimately to the what it is, i.e. the definition, as is plain in all immobile things, as are the objects of mathematics in which the for what reason is reduced to the definition of right angle, commensurate or something else which is demonstrated in mathematics. Since the definition of a right angle states that a right angle is constituted by a line falling upon another line in such a way that each part makes two equal angles, if we ask for what reason this angle is a right angle, the answer would be that it is made by a line making two equal angles from each part, and it is the same in the other questions. But sometimes the for what reason is reduced to the first mover, for example *For what reason have some people fought? Because they were robbed,* because this is what incited them to fight. Sometimes the for what reason is reduced to the final cause, for example, if we were to ask what they fought for, the answer would be *in order to conquer.* Sometimes the for what reason is reduced to the material cause, for example, if we ask why this body is corruptible, the answer would be *because it is composed of contraries.* Thus it is plain that these are the causes and their number is as has been said.

15. Moreover it is necessary that there be four causes because, since a cause is that from whose existence the existence of another follows, the existence of that which has a cause can be considered in two ways: in one way absolutely and then the cause of existing is the form through which something is in act; in another way according as actual being comes to be from potential being. Also because everything which is in potency is reduced to act through that which is actual being it is necessary for this reason that there be two other causes, namely the matter

and the agent which reduces the matter from potency to act. Moreover the action of the agent tends toward something determined, just as it proceeds from some determined principle, because every agent does what is suitable to himself. But that towards which the action of the agent tends is called the final cause. Therefore it is necessary that there be four causes. But because the form is the cause of existing absolutely while the other three are causes of existing according as something receives existence it follows that in immobile beings we do not consider the other three causes but only the formal cause.

LESSON XI

THE PHILOSOPHY OF NATURE SHOULD DEMONSTRATE FROM ALL FOUR GENERA OF CAUSES.

1. After the Philosopher has determined the causes he here shows that the philosopher of nature demonstrates from all the causes. About this he does two things: first he states his intention; secondly he follows it out where he says, "The last three often . . ." He says first therefore that since there are four causes, as was said above, the philosopher of nature should know all of them and demonstrate naturally through all of them by reducing the question, for what reason, to any of the previously mentioned four causes, namely to the form, the mover, the end and the matter.

Then when he says, "The last three often . . .", he follows out his intention. About this he does two things: first he sets out certain things which are necessary for showing the proposition; secondly he proves the proposition where he says, "The question 'why' . . ." About the first he sets out two things which are necessary for the subsequent proof. The first is about the relation of the causes to each other; the second is about the consideration of the philosophy of nature where he says, ". . . and so too, in general . . ."

2. He says first therefore that it often happens that three causes occur in one in such a way that the formal and final causes are one in number. This is to be understood of the final

cause of generation but not of the final cause of the thing generated because the end of the generation of man is the human form, but the end of man is not his form; rather by means of his form he is able to operate for an end. But the moving cause is the same in species as each of these. This is true chiefly in univocal agents in which the agent makes something like himself in species, as man generates man. In these the form of the generator which is the principle of generation is the same in species as the form of what is generated which is the end of generation. But in non-univocal agents it is different because in these the things which come to be cannot extend so far that they follow the form of the generator according to the same reason of species, rather they participate in a similitude of it according as they can, as is plain in those which are generated by the sun. Therefore not every agent is the same in species as the form which is the end of generation, nor again is every end the form. For this reason he purposely adds *often*. But matter is neither the same in species nor the same in number as the other causes because matter as such is being in potency while the agent is a being in act as such, and the form or end is the act or perfection.

3. Then when he says, ". . . and so too, in general . . .", he sets out the second thing which is about what causes the philosopher of nature should consider. He says that any movers which move by being moved fall in the consideration of the philosopher of nature, but those which move without being moved do not fall in the consideration of the philosopher of nature who considers natural things, which have in themselves a principle of motion. Those movers which are not moved do not have in themselves a principle of motion, since they are not moved but are immobile. Thus they are not natural and consequently do not pertain to the consideration of the philosopher of nature.

Thus it is plain that *there are three branches of study,* i.e. the study and intention of philosophy is threefold, according to the three genera of things which are found. Some things are immobile and one branch of study is about this; another branch of study is about those things which are mobile but incorruptible, as are the heavenly bodies; the third branch of study is about mobile and corruptible things, as are the inferior bodies. The first belongs to metaphysics, but the other two belong to natural science which treats all mobile things, both corruptible and in-

corruptible. Some have badly understood this passage by wanting to reduce these three to the three parts of philosophy, namely to mathematics, metaphysics and physics. For astronomy which seems to consider incorruptible mobile things is more natural than mathematical, as was said above, because insofar as it applies mathematical principles to natural matter it considers mobile things. Therefore this division is according to the diversity of things existing outside the soul and is not to be taken according to the division of the sciences.

4. Then when he says, "The question 'why' . . .", he shows the proposition. About this he does two things: first he shows that it is proper for the philosopher of nature to consider all causes and to demonstrate through these, which were his two propositions; secondly he proves certain things which he supposes in this proof where he says, "We must explain then . . ." About the first he does two things: first he shows that the philosopher of nature considers all causes; secondly, that he demonstrates through all causes where he says, "We must explain the 'why' . . ." About the first he does two things: first he shows that the philosopher of nature considers matter, form, and the mover; secondly, that he considers the end where he says, ". . . and the essence of that which . . ." About the first he does two things: first he proposes what he intends; secondly he proves it where he says, "For in respect of coming to be . . ." Therefore he concludes first from the preceding that the for what reason is given by the philosopher of nature by reduction to the matter, to the what it is, i.e. to the form, and to the first mover.

5. Then when he says, "For in respect of coming to be . . .", he proves the proposition as follows: It was said that the philosopher of nature considers those things which are moved, both generable and corruptible. Therefore whatever must be considered about generation must be considered by the philosopher of nature. But in generation we must consider form, matter and the mover because whoever wants to consider generation as to its causes considers it in this way: first what is that which comes to be after something, for example fire comes to be after air when fire is generated from air, and in this one considers the form through which what is generated is what it is. Likewise one considers what it is that first did this, i.e. what first moved this to generation, and this is the mover. Again one considers what

it is that sustains this, and this is the subject and matter. And we consider not only the first mover and the first subject in generation, but also those things which follow. Thus it is plain that the philosopher of nature considers the form, mover and matter. However, he does not consider all movers because there are two kinds of moving principles, namely the moved and the unmoved. Of these that which is not moved is not natural because it does not have in itself a principle of motion. This is the moving principle which is absolutely immobile and the first of all, as will be shown in the eighth book.

6. Then when he says, ". . . and the essence of that which . . .", he shows that the philosopher of nature also considers the end. He says that the form and the what it is pertains to the consideration of the philosopher of nature insofar as it is the end and that for the sake of which generation takes place because we said above that the form and the end coincide in the same thing. Also because nature operates for the sake of something, as will be proved below, it is necessary that the philosopher of nature consider the form not only insofar as it is form but also insofar as it is the end. However, if nature did not act because of something, the philosopher of nature would consider the form as form but not as end.

7. Then when he says, "We must explain the 'why' . . .", he shows how the philosopher of nature demonstrates by all the causes. First he shows how he demonstrates by the matter and the moving cause, which two causes are prior in generation. Secondly he shows how he demonstrates by the form where he says, ". . . that this must be so if . . ." Thirdly he shows how he demonstrates by the end where he says, ". . . and because it is better . . ." He says first therefore that in natural things the for what reason must be given completely, i.e. according to each genus of cause, so that because this precedes, whether that be the matter or the mover, it is necessary that this exist consequently. For example, if something is generated from contraries, it is necessary that that be corrupted; and if the sun is near the north pole, it is necessary that the days become longer, the cold decrease and the warmth increase for those who live in the northern latitudes. However, we should notice that it is not necessary that something always follow from the preceding matter or mover: sometimes something follows simply, i.e. always, as in those which

were mentioned; but sometimes something follows frequently, for example from the human seed and the mover in generation it more frequently follows that the one generated has two eyes, still it sometimes happens otherwise. Likewise from the fact that the matter in the human body is so disposed it often happens that fever is generated because of decay, but sometimes this is prevented.

8. Then when he says, ". . . that this must be so if . . .", he shows how the philosophy of nature should demonstrate by the formal cause. In order to understand this it should be noted that when something follows necessarily from causes prior in generation, namely from matter and the mover, the demonstration can be taken from these, as was said above; but not when something frequently follows. In the latter case the demonstration should be taken from that which is posterior in generation because something necessarily follows from this just as the conclusion follows from the propositions of the demonstration. Thus we should proceed in demonstration as follows: If this is to come to be, this and this are required; for example, if man is to be generated, it is necessary that there be human seed acting in generation. But, if we were to proceed conversely, from the proposition, *there is human seed acting in generation*, the proposition, *therefore man will be generated*, does not follow as the conclusion follows from the premisses. But that which should come to be, i.e. that in which the generation is terminated, was that which was to be [*quod quid erat esse*], i.e. the form, according to what was said above. Thus it is clear that when we demonstrate according to this mode, *if this is to come to be*, we demonstrate by the formal cause.

9. Then, when he says, ". . . and because it is better . . .", he shows how the philosopher of nature demonstrates by the final cause. He says that sometimes the philosopher of nature demonstrates that something is because it is more fitting that it should be so. For example, if he were to demonstrate that the front teeth were sharp because it is better that they be so in order to cut the food and nature does what is better. However, nature does not do what is better simply but what is better according as it belongs to each substance, otherwise nature would have given each animal a rational soul because the latter is better than the irrational soul.

LESSON XII

THE ARGUMENT OF THOSE WHO DENY THAT NATURE OPERATES FOR AN END.

1. After the Philosopher shows that the philosopher of nature demonstrates from all causes he here shows certain things which he had presupposed; namely that nature acts for an end and that in some things the necessary is not from causes prior in existence, which are the mover and matter, but from posterior causes, which are the form and end. About this he does two things: first he proposes his intention; secondly he follows it out where he says, "A difficulty presents itself . . ."

He says first therefore that we must state first that nature is one of those causes which act because of something. This pertains to the question of providence because those things which do not know the end tend to an end only as directed by something which knows, as the arrow by the archer. Thus, if nature operates for an end, it is necessary that it be ordered by something that is intelligent, which is the work of providence.

After this we must state in what way the necessary is found in natural things: namely whether the necessity of natural things is always from matter or sometimes from matter and the mover or sometimes from the form and end. We must examine this because all the ancient naturalists reduce natural effects to this cause in giving the reason for them, namely that it is necessary that they happen so because of the matter; for example because fire is designed to be such and to produce such an effect, and in the same way cold, and all similar things, it is necessary that those things which are caused by these come to be or exist. And if some of the ancient naturalists touched upon any other cause than the necessity of matter, still they did not make much of it because although they posited other causes, namely the intellect which Anaxagoras posited and friendship and strife which Empedocles posited, these were used only in certain general things as in the constitution of the world. In particular effects they neglected such causes.

2. Then when he says, "A difficulty presents itself . . .", he follows out his intention. First he asks whether nature acts for an end. Secondly he asks how the necessary is found in natural

things where he says, "As regards what is 'of necessity' . . ." About the first he does two things: first he gives the opinion of those who say that nature does not act for an end, along with their argument; secondly he disproves it where he says, "Yet it is impossible . . ."

3. In the first we should note that those who said that nature does not act for an end tried to confirm this by removing that whereby nature chieflly seems to operate for an end. Moreover that which chiefly demonstrates that nature operates for an end is the fact that in the operation of nature we find that something takes place as well or as fitting as it can be, for example nature makes the foot so that it is apt for walking; thus if it loses its natural disposition it is not apt for this use, and the same is true in other things. Now because it was this that they chiefly tried to oppose he says that one can argue that there is nothing to prevent nature from not acting for an end nor does it always do what is better because we sometimes find that a utility comes from the operation of nature which is not the end of that natural operation but only something which happens to occur thus. For example, if we were to say that *Jupiter pours out rain*, i.e. God or universal nature, not for the sake of growing grain but rather the rain comes from the necessity of matter. Because when the lower parts of the world were heated by the proximity of the sun it was necessary that vapors be produced from the water; then when these vapors, ascending because of the heat, get to the place where the heat fails because of their distance from the place where the sun casts its rays it is necessary that the water, ascending as vapor, be condensed there and by condensation the vapors are changed back into water; when water is thus generated it is necessary that it fall downward because of gravity. When this happens the grain grows, but it did not rain so that the grain might grow because in the same way in some places the grain is destroyed because of the rain, as when the water collects in the field. Nor did it rain in order to destroy the grain, rather this happened by chance when the rain fell. In the same way it seems to be by chance that the grain accidentally grows when the rain falls. Thus it seems that nothing prevents the same thing being true in the parts of animals which seem to be so disposed for some end; for example one might say that the sharpness of the front teeth with their aptitude for cutting food and the width of

the molars with their utility for grinding it come from the necessity of matter. Thus nature did not make these teeth for such utilities, rather when the teeth, so made by nature because of the necessity of matter, came along it happened that they followed that form and when that form existed such utility followed. And the same thing can be said of all the other parts which seem to have a determined form for some end.

4. Also because one might say that such uses follow always or for the most part, but what is always or frequently belongs to nature, in order to exclude this objection they say that in the beginning of the making of the world four elements came together to make natural things and many and various dispositions of natural things were produced. Among these all that happened to have some aptitude for use, as if they were made for this reason, were preserved by the fact that they had a disposition apt for conservation; and this was not given them by an agent intending an end but by that which is *per se* vain, i.e. by chance. On the other hand those which did not have this disposition were destroyed and are daily being destroyed. For example Empedocles said that in the beginning certain beings were generated which were part ox and part man.

5. This therefore is the argument which some raise, or if there is another it is like this. But we should note that this argument employs an illogical example because although the rain has a necessary cause on the part of matter, still it is ordered to an end, namely to the conservation of generable and corruptible things, because there is mutual generation and corruption in these inferior things in order that perpetual existence might be preserved in them. Thus the example of the growing grain is illogically employed because a universal cause is compared to a particular effect. But this also should be noted, that the growth and conservation of the growing earth happens for the most part when it rains, but its corruption happens seldom. Thus even though the rain is not for destruction it still does not follow that it is not for conservation and growth.

LESSON XIII

HE DEMONSTRATES BY PROPER ARGUMENTS THAT NATURE OPERATES FOR AN END.

1. Having given the opinion and argument of those who say that nature does not act for an end he here disproves it; first by proper arguments and secondly by arguments taken from those things by which the adversaries attempted to show the contrary where he says, "Now mistakes come to pass . . ."

2. For the first he gives five arguments the first which is as follows: All things which come to be naturally either come to be always or frequently; but none of those things which come to be by fortune or by the *per se* vain, i.e. chance, come to be always or frequently because we do not say that it is by fortune or chance that it often rains in the winter [*hiems*: the rainy season]; but we would say that it was by chance if it were to rain very much *under the Dog*, i.e. during the dog days. Likewise we do not say that it is by chance that we have heat during the summer but only if this happens in the winter.

From these two he argues as follows: All things which come to be come to be either by chance or for an end because those things which happen outside the intention of the end are said to happen casually; but it is impossible that those things which come to be always or frequently happen by chance; therefore those things which come to be always or frequently come to be for something. But all those things which come to be according to nature come to be either always or frequently, as they themselves confess. Therefore all those which come to be by nature come to be because of something.

3. He gives the second argument where he says, "Further, where a series has . . ." He says that in anything where there is an end both the prior and those things which follow are done for the sake of the end. Having supposed this he argues as follows: As something is done naturally so it is innately designed to be done because when I say *naturally* I mean *innately designed.* Also this proposition is convertible because as anything is innately designed to be done so it is done, but we must add the condition, unless it be impeded. Therefore we take first that which does not have an exception, namely that as something is

done naturally so it is innately designed to be done. But those things which come to be naturally are so done that they are brought to an end; therefore they are innately designed to be done so that they are for an end. This is what is meant when we say that nature desires an end, namely that it has a natural aptitude for the end. Thus it is evident that nature acts for an end.

He shows what he had said by an example because we arrive at the posterior from the prior both in art and in nature. Thus, if artificial things, as a house, were to come to be by nature, they would come to be in that order in which they now come to be by art. For example first the foundation would be built, afterwards the walls and finally the roof would be added. This is the way nature proceeds in those things which are attached to the earth, namely in plants whose roots like a foundation are fastened to the earth while the trunk like the walls are up in the air and the leaves are over everything like a roof. Similarly, if those things which come to be by nature were made by art, they would come to be in the way in which they are innately designed to come to be by nature, as is plain in health which is produced both by art and by nature, because just as nature heals by heating and cooling so also does art. Thus it is clear that in nature one thing is because of another, namely the prior because of the posterior, as it is in art.

4. He gives the third argument where he says, ". . . and generally art completes . . ." He says that art does certain things that nature cannot do, as making a house and the like, but in those things which can come to be both by art and by nature art imitates nature, as is plain in the aforesaid example of health. Therefore if those things which come to be by art are because of an end it is clear that those also which come to be by nature come to be because of an end, since the prior and posterior are similarly related in each. However, it can be said that this is not a different argument from the preceding but a complement and explanation of it.

5. He gives the fourth argument where he says, "This is most obvious . . ." This argument is taken from those things in nature which more evidently seem to be done for something. Thus he says that it is most evident in animals that nature acts because of something because these act neither by art, by inquiry nor by deliberation still it is clear in their operations that they operate

because of something. Because of this some ask whether spiders, ants and similar animals operate by intellect or some other principle. However, it is clear that they do not operate by intellect but by nature because they always operate in the same way. Every swallow makes its nest in the same way and every spider its web which would not be true if they operated by intellect and art because every builder does not make a house in the same way because the artist has the ability to judge about the form of the artificial thing and can vary it. Again, proceeding from animals to plants, we see in these that some things are made to be useful for an end, as the leaves are useful for protecting the fruit. Therefore, if all these, namely the swallow making its nest, the spider its web, the plants producing foilage to protect the fruit and the roots in plants are not above but are below so that they can take their nourishment from the earth, are by nature and not by art, it is clear that the final cause is found in those things which come to be and exist by nature, namely by nature operating because of something.

6. He gives the fifth argument where he says, "And since 'nature' means . . ." He says that since nature is said in two ways, namely of the matter and of the form, and form is the end of generation, as was said above; but it is of the reason of the end that other things come to be because of it; it follows that existence and becoming for the sake of something are found in natural things.

LESSON XIV

THAT NATURE ACTS FOR AN END IS DEMONSTRATED FROM THOSE THINGS FROM WHICH SOME CONCLUDED THE OPPOSITE.

1. After the Philosopher shows by proper arguments that nature acts for something he here intends to show this by removing those things by which some thought the contrary. This is divided into three parts according to the three things by which some seemed to be moved to deny this. The second begins where he says, "But the person who asserts this . . ." The third begins where he says, "It is absurd to suppose . . ."

2. The first thing which seemed to move some to deny that nature acts for an end was the fact that they sometimes saw it happen otherwise, as happens in monsters which are sins of nature. Thus also Empedocles said that in the beginning of the constitution of things some were produced without the form and order which is now commonly found in nature.

3. Therefore to exclude this he induces four arguments. For the first of these he shows that although art acts because of something still it happens that sin comes to be in those things which come to be by art because sometimes the grammarian does not write correctly and the doctor sometimes gives someone the wrong medicine. Thus it is evident that sin occurs also in those things which exist according to nature even though nature operates because of something. Moreover of those things which come to be because of something in art, some come to be according to art and they come to be correctly, but there are some in which the artist, not acting according to art, fails. In these sin occurs, since the art acts because of something, because if the art did not act for a determined end there would be no sin no matter in what way the art operated because the operation of the art would be the same for all things. Therefore the fact that sin is found in art is a sign that art operates because of something. The same thing happens in natural things in which monsters are like sins of a nature acting because of something, insofar as the right operation of nature is deficient. The fact that sin is found in natural things is a sign that nature acts because of something. Therefore in the substances which Empedocles said were constituted in the beginning of the world *ox-progeny*, i.e., half ox and half man, if they could not arrive at some end and term of nature such that they would be conserved in existence, this was not because nature did not intend this but because these things which it was not possible to save were not generated according to nature but by a corrupt natural principle, just as even now it happens that some monstrous parts are generated because of the corruption of the seed.

4. He gives the second argument where he says, "Further seed must have . . .", which is as follows: Wherever there are determined principles and a determined order of proceeding there should be a determined end because of which the other things come to be; but in the generation of animals there is a

determined order of proceeding because the seed should come to be first and the animal does not exist immediately from the beginning, and again the seed itself is not immediately enclosed in a hard shell but is in the beginning soft and tends to perfection in a certain order; therefore there is a determined end in the generation of animals. Therefore monsters and sins in animals do not happen because nature does not act because of something.

5. He gives the third argument where he says, "Again, in plants too . . .", which is as follows: Although in plants nature acts because of something just as in animals, still in plants there is a lesser *degree of organization*, i.e. distinction, or less can be inferred from their operations. Therefore, if sins and monsters happen in animals because of the fact that nature does not act because of something, this ought to happen to a greater degree in plants. Therefore we ask whether *olive-headed vine-progeny*, i.e. half olive and half vine, come to be like the ox-progeny come to be in animals, or not? To say that they do occur seems illogical, but still they should exist if this happens in animals by the fact that nature does not act because of something. Therefore the reason for this occurence in animals is not because nature does not act because of something.

6. He gives the fourth argument where he says, "Moreover, among the seeds . . .", which is as follows: Just as animals are generated by nature, so also are the seeds of animals; therefore, if it happens that something takes place in the generation of animals in any way whatsoever and not as by nature acting for a determined end, the same thing would be true in seeds, namely any seed would be produced from anything. This is evidently false; therefore the first is also false.

7. Then when he says, "But the person who asserts . . .", he excludes the second notion by which some were moved to say that nature does not act because of something. Some held this view because those things which happen naturally seem to proceed from prior principles, as are the agent and matter, and not from the intention of the end. But he shows the contrary saying that he who says this, namely that nature does not act because of something, destroys nature and those things which are according to nature because those things are said to be according to nature which are moved without interruption until they arrive

at some end; and these are not moved by just any principle to just any end but by a determined principle to a determined end because one proceeds from the same principle to the same end unless something prevents this. Moreover it happens that that for the sake of which something comes to be sometimes comes to be by fortune when it is not done because of this; for example, if one were to go outside and come back bathed, we say that this is by fortune because his bathing took place as if he had gone out because of this, even though he did not go out because of this, thus his taking a bath is accidental (because fortune is one of the *per accidens* causes, as was said before). But if this happened to him always or frequently when he went out we would not say that it was by fortune. However, what happens in natural things is not *per accidens* but is always so unless something impedes this. Thus it is clear that the determined end which follows in nature does not follow by chance but by the intention of nature. From this it is plain that it is against the reason of nature to say that nature does not act because of something.

8. Then when he says, "It is absurd to suppose . . .", he excludes the third thing by which one can suppose that nature does not act for an end. Some thought that nature does not act because of something because it does not deliberate. But the Philosopher says that it is illogical to hold such an opinion because it is evident that art acts because of something, and still it is clear that art does not deliberate. The artist does not deliberate insofar as he has the art but insofar as he lacks the certitude of the art. Thus the most certain arts do not deliberate, for example the writer does not deliberate as to how he should form the letters. And even those artists who do deliberate do not deliberate in following out the definite principle of art which they have found. Thus the harpist, if he were to deliberate in striking any chord, would seem most inexpert. From this it is evident that lack of deliberation is found in an agent not because he does not act for an end but because he has determined means by which he acts. Thus nature also, because it has determined means by which it acts, does not deliberate because nature seems to differ from art only because nature is an intrinsic principle and art is an extrinsic principle. If the art making the ship were intrinsic to the wood, the ship would be made by nature in the same way that it comes to be by art. This is most evident in the art which

is in that which is moved, although accidentally, as the doctor who heals himself because nature is most like this art. Thus it is evident that nature is nothing else than the reason of a certain art, namely the divine, placed in things by which the things themselves are moved to a determined end, just as if the artist who makes the ship could give the wood the power of moving itself to produce the form of the ship.

Finally in conclusion he says that it is clear that nature is a cause and that it acts because of something.

LESSON XV

IN WHAT WAY NECESSITY IS FOUND IN NATURAL THINGS.

1. After the Philosopher shows that nature acts for an end he here proceeds to ask about the second question, namely how necessity is found in natural things. About this he does three things: first he raises the question; secondly he gives the opinion of others where he says, "The current view places . . ."; thirdly he determines the truth where he says, "Whereas, though the wall . . ."

2. Therefore he asks first whether in natural things there is a *simple* necessity, i.e. absolute, or a *conditional* necessity, i.e. by supposition. In order to understand this we must note that the necessity which depends on prior causes is an absolute necessity, as is plain from the necessity which depends upon matter, because the corruptibility of an animal is an absolute necessity because to be composed of contraries follows from the fact that it is an animal. Likewise that which has necessity from the formal cause is absolutely necessary; for example that man is rational or that the triangle has three angles equal to two right angles which is reduced to the definition of the triangle. Likewise that which has necessity from the efficient cause is absolutely necessary; for example because of the motion of the sun it is necessary that night and day alternate. But that which has necessity from that which is posterior in existence is necessary on condition or supposition; for example, if we were to say that this is necessary if

this is going to take place. This latter necessity is from the end and from the form insofar as it is the end of generation. Therefore to ask whether there is necessity simply or from supposition in natural things is the same as to ask whether the necessity in natural things is found from the end or from matter.

3. Then when he says, "The current view places . . .", he gives the opinion of others. He says that some think that the generation of natural things comes from the absolute necessity of matter, for example they would say that the walls or the house is as it is from the necessity of the matter because the heavy parts are designed to rest on the bottom while the light things appear above. For this reason the solid and heavy stones remain in the foundation while the earth is placed above the stones as being lighter, as is plain in walls made of bricks which in turn are made of earth. But wood, which is lightest of all, is placed on top, namely in the roof. In the same way they thought that the dispositions of natural things came from the necessity of matter, for example man has feet below and hands above because of the heaviness or lightness of the humors.

4. Then when he says, "Whereas, though the wall . . .", he determines the truth. About this he does two things: first he shows in what way there is necessity in natural things: secondly he compares the necessity of natural things to the necessity which exists in the demonstrative sciences where he says, "Necessity in mathematics . . ." He says first therefore that although it seems illogical to say that the disposition in natural things is such because of the necessity of matter, just as this also appears illogical in artificial things whose example was given; still such a disposition is not made in natural and artificial things without the material principles having an aptitude for such disposition because a house would not be suitably built unless the heavier things were in the foundation and the lighter above these. Still one should not say that the house is so disposed that one part is below and the other above *because of this*, i.e. because of the heaviness and lightness of certain parts, except insofar as this preposition *because of* means the material cause which is because of the form; but the parts of the house are so disposed because of the end which is to shelter and protect men from wind and rain. Also, just as it is with the house, so it is in all other things in which we find action because of something because in all these

the dispositions of the things generated or made do not follow without the material principles which have the necessary matter by which they are innately designed to be so disposed. Still the things made or generated are not so disposed because the material principles are such except insofar as the *because of* means the material cause, rather they are so disposed because of some end and the material principles are sought so that they are apt for this disposition which the end requires, as is plain in the saw because the saw is *such*, i.e. it is of such disposition or form; therefore it should be *of such*, i.e. it should have such matter; and it is *such*, i.e. it is of such disposition or form, *because of this*, i.e. because of some end. However, this end, which is sawing, could not come about unless it were made of iron; therefore it is necessary that the saw be made of iron if it is going to be a saw and if its work is going to be its end. Therefore it is plain, that in natural things there is necessity from supposition, just as in artificial things. But this is not in such a way that what is necessary is as the end because that which is necessary is posited on the part of matter, but the reason for the necessity is posited on the part of the end because we do not say that it is necessary that there be such an end because matter is such, rather the opposite: because such an end and form is going to exist it is necessary that such matter exist. Thus the necessity is posited in the matter but the reason for the necessity is posited in the end.

5. Then when he says, "Necessity in mathematics . . .", he compares the necessity which exists in the generation of natural things to the necessity which is found in the demonstrative sciences: first, as to the order of necessity; secondly, as to that which is the principle of necessity where he says, ". . . and the end is 'that for the sake of which' . . ." He says first therefore that in some way the necessity which is found in the demonstrative sciences is similar to that which is found in those things which are generated according to nature. In the demonstrative sciences we find an a priori necessity, for example we say that because the definition of a right angle is such it is necessary that a triangle be such, namely that it have three angles equal to two right angles. Therefore the conclusion comes of necessity from this prior notion which is assumed as a principle. But the opposite does not follow, namely if the conclusion exists that the principle exists because sometimes a true conclusion can be syllo-

gized from false propositions. However, it does follow that if the conclusion is not true neither is the premised principle because the false is only syllogized from the false. But in those things which come to be because of something, either according to art or according to nature, the opposite is true because, if the end will be or is, it is necessary that that which is before the end will be or is. But if that which is before the end is not, neither will the end exist, just as in the demonstrative sciences, if the conclusion is not, there will be no principle. Therefore it is plain that in those things which come to be because of an end the end holds the same order as the principle holds in the demonstrative sciences. This is true because the end is the principle, not of the action, but of the ratiocination because we begin from the end to reason about those things which are for the end. But in the demonstrative sciences we do not consider the principle of the act but of the ratiocination because in the demonstrative sciences there are no actions but only ratiocinations. Therefore it is proper that in those things which come to be for an end the end hold the place of the principle which is found in demonstrative science. Thus there is a similitude in each, although they seem to be opposed because the end is the last in action which is not true in demonstration.

Therefore he concludes that if there is going to be a house, which is the end of generation, it is necessary that that which is for the end, namely the matter, come to be or preexist; for example it is necessary that the bricks and stones preexist if there is going to be a house. However, the end does not exist for the matter but it will not exist if the matter does not exist; for example the house will not exist if there are no stones nor would the saw if there were no iron. Also because in the demonstrative sciences the principles do not exist if the conclusion does not these are like those things which are for an end, as the principle is like the end, as was said. Therefore it is clear that that is said to be necessary in natural things which is like matter or the material motion, and the reason for this necessity is from the end because by reason of the end it is necessary that there be such matter. Also the philosopher of nature should give each cause, namely the material and the final, but more the final because the end is the cause of the matter but the opposite is not true. It is not true that the end is such because the matter is such, rather the matter is such because the end is such, as was said.

6. Then when he says, ". . . and the end is 'that for the sake of which' . . .", he compares the necessity of natural generation to the necessity of the demonstrative sciences as to that which is the principle of necessity. It is clear that the principle of demonstration in the demonstrative sciences is the definition; likewise the end which is the principle and reason of necessity in those things which come to be according to nature is a principle taken from the reason and the definition because the end of generation is the form of the species which the definition signifies. This is also evident in artificial things because just as the demonstrator in demonstrating takes the definition as principle so also the builder in building and the doctor in healing; for example because the definition of a house is such this should come to be and exist in order that the house come to be, and because this is the definition of health this should be done in order that one might be healed, and if these then those also until we get to those things which are coming to be. Moreover it sometimes happens in the demonstrative sciences that there is a threefold definition. One is a principle of demonstration, as saying that *thunder is the extinction of fire in a cloud.* Another is the conclusion of demonstration, as saying that *thunder is a continuous sound in the* clouds. But a third includes both, as saying that *thunder is a continuous sound in the clouds because of the extinction of fire in a cloud.* The latter comprehends in itself the whole demonstration without the order of demonstration. Thus it is said in the first book of the *Posterior Analytics* that a definition is a demonstration differing by position. Therefore because in those things which come to be for an end the end is like the principle in the demonstrative sciences and those things which are for the end are like the conclusion, so also we find in the definition of natural things that which is necessary because of the end because if anyone wants to define the work of a saw, since this is cutting of a kind which will not take place unless the saw has teeth and these will not be apt for cutting unless they are of iron, it will be necessary to posit iron in the definition of the saw. There is nothing to prevent one from positing certain parts of matter in the definition, not certainly individual parts as this flesh and these bones, but common parts as flesh and bones, and this is necessary in the definition of all natural things. Therefore just as the definition which brings together in itself the principle and

conclusion of demonstration is the whole demonstration, so also the definition bringing together the end, the form and the matter comprehends the whole process of natural generation.

THE REASON FOR AN INTRODUCTION TO THE PHILOSOPHY OF NATURE

In the following passage Aristotle gives an excellent reason for an introductory study of the philosophy of nature:

Every systematic science, the humblest and the noblest alike, seems to admit of two distinct kinds of proficiency; one of which may be properly called scientific knowledge of the subject, while the other is a kind of educational acquaintance with it. For an educated man should be able to form a fair off-hand judgment as to the goodness or badness of the method used by a professor in his exposition. To be educated is in fact to be able to do this, and even the man of universal education we deem to be such in virtue of his having this ability. It will, however, be understood that we only ascribe universal education to one who in his own individual person is thus critical in all or nearly all branches of knowledge, and not to one who has a like ability merely in some special subject. For it is possible for a man to have this competence in some one branch of knowledge without having it all. It is plain then that, as in other sciences, so in that which inquires into nature, there must be certain canons by reference to which an auditor shall be able to criticize the method of a professed exposition quite independently of the question whether the statements made be true or false. (*On the Parts of Animals*, Bk. I, Ch. 1)

In another passage in the same work Aristotle shows that a study of natural things is most necessary to anyone who desires to know the higher things.

Of things constituted by nature some are ungenerated, imperishable, and eternal, while others are subject to generation and decay. The former are excellent beyond compare and are divine, but less accessible to knowledge. The evidence that might throw light on them, and on the problems which we long to solve respecting them, is furnished but meagerly by sensation; whereas, respecting perishable plants and animals, we have abundant information, living as we do in their midst, and ample data may be collected concerning all their various kinds, if only we are willing to take sufficient pains. Both departments, however, have their special attraction. The meager conceptions to which we can attain of celestial things give us, from their ex-

cellence, more pleasure than all our knowledge of the world in which we live; just as a half glimpse of persons that we love is more delightful than a leisurely view of other things, whatever their number and dimensions. On the other hand, in certitude and in completeness our knowledge of terrestrial things has the advantage. Moreover, their greater nearness and affinity to us balances somewhat the loftier interest of the heavenly things that are the objects of higher philosophy. Having already treated of the celestial world, as far as our conjectures could reach, we proceed to treat of animals, without omitting, to the best of our ability, any member of the kingdom, however ignoble. For, if some have no graces to charm the sense, yet even these, by disclosing to intellectual perception the artistic spirit that designed them, give immense pleasure to all who can tract links of causation, and are inclined to philosophy. Indeed it would be strange if mimic representations of them were attractive, because they disclose the mimetic skill of the painter or sculptor, and if the original realities themselves were not more interesting, to all at any rate who have eyes to discern the reasons that determined their formation. We therefore must not recoil with childish aversion from the examination of the humbler animals. Every realm of nature is marvelous: and as Heraclitus, when the strangers who came to visit him found him warming himself at the stove in the kitchen and hesitated to go in, is reported to have bidden them not to be afraid to enter, as even in that kitchen divinities were present, so we should venture on the study of every kind of animal without distaste; for each and all will reveal to us something natural and something beautiful. Absence of haphazard and the conduciveness of everything to an end are to be found in Nature's works in the highest degree, and the resultant end of her generations and combinations is a form of the beautiful.

If any person thinks the examination of the rest of the animal kingdom an unworthy task, he must hold in like disdain the study of man. For no one can look at the members of the human body—blood, flesh, bones, organs, and the like— without much repugnance. Moreover, when any one of the parts or structures, be it which it may, is under discussion, it must not be supposed that it is its material composition to which attention is being directed or which is the object of the discussion, but the relation of

such part to the total form. Similarly, the true object of architecture is not bricks, mortar, or timber, but the house; and so the principal object of the philosophy of nature is not the material elements, but their composition, and the totality of the form, independently of which they have no existence. (Ch. 5)

St. Albert, while repeating the same notion, adds some notes on the usefulness of a knowledge of nature in the following:

Moreover, we must consider that the science in this book [Meteorology], and also all natural science, is not to be despised by man. Indeed, he who despises it despises himself. Now, although many might say that natural science ought not to be esteemed, because it is not useful for the contemplation of divine things, in which the happiest life and the felicity of man consists, as the Philosopher says in the tenth book of the *Ethics*, nevertheless these deecive themselves because not only the scince in this book but also all natural science, both the part which considers the common notions and that which considers the special and proper principles of each thing, assists in such contemplation of divine things. This is true because we arrive at a knowledge of the causes through the things which are evident and natural, as through effects. Because of this The Philosopher, in the *Metaphysics*, begins with sensible substances, and in the twelfth book he proves the nature of the separated substances by arguments from astronomy. Therefore whatever other science we learn we learn in order to arrive at a knowledge of divine things, and whoever acquires the sciences for any other reason has a perverted attitude towards science, unless he be forced to it by necessity. Nor is it vile to know these particular natural things because, just as it is not vile to examine a picture of ugly animals in order that the beautiful ones might be better known by opposition, so neither is it vile to know the causes of these things in order that we might arrive at a knowledge of the first causes. Indeed, this is much less vile, because things are in the intellect in a much more immaterial way than they are in sense.

Moreover, the science in this book is useful, not only for the knowledge of divine things, as was said, but for nearly all of natural science, and especially for the science about minerals [chemistry] which was composed by Aristotle but has not yet come down to us . . . It is also useful for medicine because here

we learn the cause of many things whose existence is considered in medicine. (*Commentary on the Meteorology,* Book IV, less. 1.)

OUTLINE OF THE PHYSICAL WORKS OF ARISTOTLE

I. Treatment of mobile being in general: The *Physics.*
 1. The universal principles of natural science. (Books I-II)
 1a. The principles of the subject: mobile being (Book I)
 2a. The principles of the science. (Book II)
 2. The treatment of mobile being in general. (Books III-VIII)
 1a. He determines the nature of motion in itself. (Books III-VI)
 1b. The nature of motion. (Books III-IV)
 1c. Those things which belong to motion intrinsically. (Book III)
 2c. Those things which belong to motion extrinsically. (Book IV)
 2b. The parts of motion. (Books V-VI)
 1c. The species of motion. (Book V)
 2c. The quantitative parts of motion. (Book VI)
 2a. The nature of motion in comparison to movers and mobiles. (Books VII-VIII)
 1b. He shows that there is a first motion and a first mover. (Book VII)
 2b. He asks what kind the first motion, the first mover and the first mobile are. (Book VIII)

II. The treatment of motion in particular.
 1. Local motion: The treatise, *On the Heavens.*
 1a. He treats of the corporeal universe. (Book I)
 2a. He treats those bodies which are moved by a circular motion. (Book II)
 3a. He treats those bodies which are moved in a straight line. (Book III)
 2. The motion to form: The treatise, *On Generation and Corruption*

1a. The general treatment of the subject. (*On Generation and Corruption*)
 1b. Generation and corruption in general. (Book I)
 2b. In particular. (Book II)
2a. The particular treatment of the subject.
 1b. The transmutations of the elements: The *Meteorology.*
 1c. The transmutations of the supraterrestrial elements. (Book I)
 2c. The transmutations of the terrestrial elements. (Books II-III)
 1d. The principal properties. (Book II)
 2d. Those which follow these. (Book III)
 3c. The transmutations of the elements in mixtures. (Book IV)
 2b. Inorganic, mixed, mobile bodies: The treatise, *On Minerals.*
3. The motion of augmentation or growth: the treatise *On the Soul* and the books which follow it.
1a. The consideration of the soul in itself: the treatise *On the Soul.*
2a. The general application of the notion of the soul to living things.
 1b. *On Sense and Sensation.*
 2b. *On Memory and Remembering.*
 3b. *On Sleeping and Waking.*
 4b. *On Dreams.*
 5b. *On Divination in Sleep.*
 6b. *On the Length and Brevity of Life.*
 7b. *On Youth and Old Age; On Life and Death; On Respiration.*
3a. A more particular application to living things.
 1b. *The History of Animals.*
 2b. *The Parts of Animals.*
 3b. *The Generation of Animals.*

OUTLINE OF THE COMMENTARY ON BOOK I

INTRODUCTION

The matter and subject of Natural Science. We must proceed from the more universal principles, those more known to us. (Lesson I)

I. What the matter and subject of natural philosophy is. (nn. 1-4)
 1. The nature of science. (nn. 1-3)
 2. The *Physics* and the order of the physical works of Aristotle. (n. 4)

II. We must proceed from the more universal principles which are more known to us. (nn. 5-11)

THE PHYSICS

I. He determines the universal principles of natural science. (Books I and II)
 1. He determines the principles of the subject. (Book I)
 1a. The opinions of others. (Lessons II-IX)
 1b. The diverse opinions of the ancients. (Lesson II, nn. 2-3)
 1c. The diverse opinions of the philosophers about the principles of nature (used in a general sense). (n. 2)
 2c. He shows that there is the same diversity in their opinions about being. (n. 3)
 2b. He shows that some of these do not concern natural philosophy. (nn. 4-8)
 1c. He shows that to disprove the opinions of Melissus and Parmenides does not pertain to natural philosophy. (nn. 4-7)
 1d. He shows that it does not pertain to natural philosophy to disprove the preceding opinion. (nn. 4-5)
 1e. No particular science argues against opinions which destroy the principles of that science. (n. 4)
 2e. It is not necessary to argue against manifestly false and improbable opinions. (n. 5)

2d. It does not pertain to natural philosophy to resolve the arguments of the preceding philoso- (nn. 6-7)

1e. The natural philosopher does not have to resolve sophistical arguments. (n. 6)

2e. We only resolve arguments which draw false conclusions from the principles of our science. (n. 7)

2c. He shows why, in the present work, it is useful to disprove these opinions. (n. 8)

3b. He proves their falsity. (Lessons III-IX)

1c. He refutes those who argue unnaturally. (Lessons III-VII)

1d. He argues against the position of Melissus and Parmenides: *Being is one.* (Lessons III-IV)

1e. On the part of *being.* (n. 2)

2e. On the part of *one;* with the attempt to resolve the problem with semantics. (Lesson III, nn. 3-5 and Lesson IV)

1f. He gives his argument against the position. (nn. 3-5)

1g. Being cannot be one as is the continuum. (n. 3)

2g. It cannot be one as is the indivisible. (n. 4)

3g. It cannot be one in definition. (n. 5)

2f. Later philosophers fell into the same error; namely, the one and the many can in no way coincide. (Lesson IV)

1g. Lycophon's *white man.* (n. 2)

2g. He disproves this. (n. 3)

3g. He concludes that it is impossible that all are one. (n. 4)

2d. He disproves the arguments of Melissus and Parmenides. (Lessons V-VII)

1e. How the arguments are to be resolved. (Lesson V, n. 2)

2e. He resolves the argument of Melissus. (nn. 3-7)

1f. The argument of Melissus. (n. 3)

2f. The solutions. (nn. 4-7)

1g. The fallacy of the consequent. (n. 4)
2g. Distinction of the notion of *principle*. (n. 5)
3g. As to the illation, *Being is infinite therefore immobile*. (n. 6)
4g. As to the illation, *If being is infinite it is one*. (n. 7)

3e. He resolves the argument of Parmenides and others like him. (Lessons VI-VII)

1f. He disproves the argument of Parmenides. (Lesson VI)

1g. He shows how it can be destroyed. (nn. 2-3)

1h. The argument of Parmenides. (n. 2)
2h. He shows that there is a certain truth in the argument. (n. 3)

2g. He resolves the argument. (nn. 4-11)

1h. Parmenides thought *being* is said in only one way. (n. 4)
2h. He did not draw his conclusions correctly. (nn. 5-11)

1i. The form of the argument. (n. 5)
2i. He applies this to Parmenides' argument. (nn. 6-11)

1j. It does not follow that *being is one*; because substance and accident are different in definition. (nn. 7-8)

1k. When it is said that whatever is besides being is non-being, the *being* cannot be taken for accident only. (n. 7)
2k. Nor can it be taken for substance only. (n. 8)

2j. He shows that it does not follow from the argument of Parmenides that there is only one being, because there is a multitude of parts. (nn. 9-11)

1k. Quantitative parts. (n. 9)

2k. The parts of the definition. (n. 10)
3k. He comments on an interpretation of the Commentator. (n. 11)
2f. He disproves the position of certain ones who conceded the illogical points of Parmenides. (Lesson VII)
1g. He states their position. (nn. 2-3)
1h. He says that above he used two arguments against Parmenides. (n. 2)
2h. The Platonists admitted both of these. (n. 3)
2g. He disproves this position. (nn. 4-6)
1h. It does not follow that non-being is something. (n. 5)
2h. It does not follow that without this proposition, *non-being is something*, all things are one. (n. 6)
2c. He disproves the opinions of those who argued *naturally*. (Lessons VIII-IX)
1d. He shows the diversity of opinions. (Lesson VIII)
1e. The opinions of those who said there was only one principle. (nn. 2-3)
1f. The opinions of the natural philosophers. (n. 2)
2f. The similarity of the opinion of Plato. (n. 3)
2e. The opinions of those who said there were many principles. (nn. 4-5)
1f. The difference between the opinion of Anaximander and that of Empedocles and Anaxagoras. (n. 4)
2f. The differences between Anaxagoras and Empedocles. (n. 5)
2d. He argues the opinion of Anaxagoras. (Lesson IX)
1e. The argument of Anaxagoras. (nn. 2-6)
1f. The presuppositions. (nn. 2-4)
1g. The first presupposition. (nn. 2-3)

1h. *Nothing comes to be from nothing.* (n. 2)
2h. Why he was led to posit this. (n. 3)
2g. The second: *Contraries come to be from each other.* (n. 4)
2f. How Anaxagoras reasoned. (n. 5)
3f. Anaxagoras answers an implicit objection. (n. 6)
2e. Aristotle disproves the argument. (nn. 7-17)
1f. He disproves it absolutely. (nn. 7-16)
1g. He gives five arguments against the posiposition. (nn. 7-14)
1h. The first argument. (n. 7)
2h. The second argument. (nn. 8-9)
1i. The argument. (n. 8)
2i. Response to an objection. (n. 9)
3h. The third argument. (nn. 10-12)
1i. Preliminary notions. (n. 10)
2i. The argument. (n. 11)
3i. An explanation of the notion of *equal parts.* (n. 12)
4h. The fourth argument. (n. 13)
5h. The fifth argument. (n. 14)
2g. He disproves the position as to the way in which it was stated. (nn. 15-16)
1h. Anaxagoras did not properly understand his own position. (n. 15)
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